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PHYSICIAN TO THE TROPICAL HOSPITAL (MINISTRY OF PENSIONS); LECTURER AT THE LONDON SCHOOL OF TROPICAL MEDICINE.

LECTURE I.

Delivered on Feb. 26th, 1920.

MR. PRESIDENT, CENSORS, AND FELLOWS OF THE COLLEGE,—I beg, first of all, to express to you my deep appreciation of the honour I have received in being asked to deliver the Milroy lectures for this year. It is an honour I shall always very greatly value.

As subject of my three lectures I have taken the Higher Fungi in Relation to Human Pathology. The study of bacteria or lower fungi is so engrossing and has given results of such magnitude that there has been perhaps a tendency hitherto to overlook the importance, from a medical point of view, of vegetal organisms higher than bacteria. There is little doubt, however, in my humble opinion, that further investigation will tend to increase the importance of these organisms in the same manner that the great medical importance of animal parasites higher than protozoa has already been recognised.

In the first lecture I propose touching briefly on the subject of fungi in general, on their morphological characters and classification, and on their biological properties. In the second and third lectures I propose studying them in relation to human disease, discussing briefly and giving a description of some of the less-known affections of mycological origin in the investigation of which I happen to have taken a part.

HISTORICAL.

Mycology, the branch of botany which deals with the higher fungi, may be said to have begun in the days of Charles II., when Hook constructed a magnifying lens, and with it examined the yellow spots so often found on the leaves of the Damascus rose. He saw that these spots were caused by certain filamentous fungi, of which he gave a detailed description, and left remarkably good drawings. He believed, like many other observers after him, that fungi arose from spontaneous generation, especially in decaying matter.

About the end of the same century (1686) Malpighi in his writings several times referred to parasitic fungi, especially to fungi of the type Mucedo. In 1753 Linnæus, in his famous book "De Species Plantarum," collected all that was known at the time on the subject, and named a large number of species. After Linnæus many botanists carried out investigations on fungi: it suffices to mention the names of Persoon, Link, Kützing. It is interesting to note, however, that fungi parasitic of man did not, apparently, attract attention until the beginning of the last century. The first fungus of importance found in man was the thrush-fungus, by Langenbeck, in 1839. This author discovered the fungus while examining microscopically the white patches of thrush he found at the autopsy of a case of typhoid, in the oral mucosa, the pharynx, and the whole of the intestine. He believed at first that the fungus was the cause, not only of the white patches, but of the typhoid infection from which the patient had died.

Berg, in 1842, gave a good description of the organism, and in 1843 Charles Robin made a complete investigation of it and called it *Oidium Albicans*, Charles Robin. Robin wrote also a book on mycology, which has remained classic: "Histoire Naturelle des Vegetaux Parasites qui croissent sur l'Homme et sur les Animaux Vivants" (J.-B. Baillière, Paris, 1853). It took a long time, however, for the idea that thrush was a mycological affection to be generally accepted. Even many years after Charles Robin's classic work, numbers of physicians did not believe in it. In the most popular text-book of pathology of the "fifties" and "sixties" of last century, one reads that the thrush patches are the result of a morbid secretion of the oral mucosa, and the author adds, "a mycologist, however, has brought forward the peculiar idea that such patches are composed of a mass of vegetable organisms."

In the same year in which the thrush-fungus was found (1839), Schoenlein discovered the fungus causing favus: this organism a little later was further investigated by Lebert, who called it *Oidium Schoenleini*, and subsequently by Remack, who named it *Achorion Schoenleini*.

In 1844 Gruby described the fungi found in ringworm, and made a distinction between ringworm due to a large spore fungus and ringworm due to a small spore fungus, a distinction which was ridiculed at the time and completely forgotten later, until many years after Sabouraud made the same distinction, and very honourably called attention to Gruby's forgotten work.

In 1846 Eichstedt discovered the fungus of pityriasis versicolor. Interest in the study of the higher microfungi continued to be great until the "seventies" and "eighties" of last century, when the epoch-making discoveries of Pasteur and Koch brought bacteriology to the front, and mycology was relegated to the background. Interest in mycology slightly revived in the last years of the century, this being principally due to the work of Sabouraud, and during the last 20 years, slowly but surely, this branch of knowledge has grown in importance.

GENERAL REMARKS AND CLASSIFICATION.

As well known, the *Regnum Vegetable*, or *Vegetal Kingdom*, is usually divided into four large groups, or *phyla*: the Thallophyta, the Bryophyta, the Pteridophyta, and the Phanerogamæ, or Flowering Plants. The Thallophyta may be defined as being vegetal organisms with a cellular structure, which is usually little differentiated, and reproducing either asexually by division and by spore formation, or sexually, after conjugation, by oöspores. These organisms may be separated into two classes:—

1. Those with Chromatophores and chlorophyll—*Algæ*, Roth, 1797.

2. Without Chromatophores or chlorophyll—*Fungaceæ*, Linnæus, 1737.

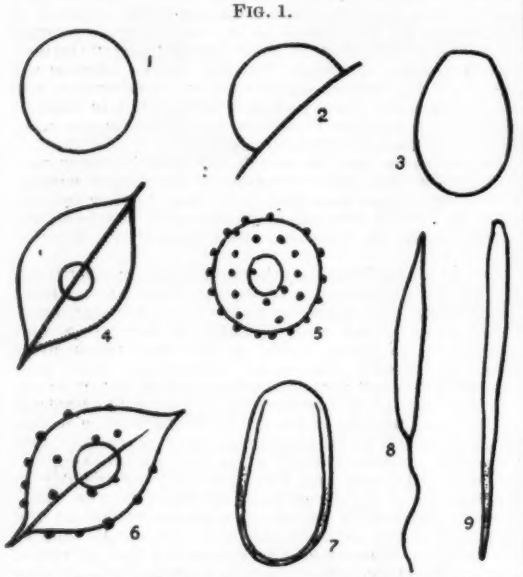
The Algæ are generally subdivided into the *Cyanophyceæ* (Blue-Green Algæ), the *Chlorophyceæ* (Green Algæ), and the *Schizomycetaceæ* (bacteria *sensu lato*, or lower fungi). It must be noted, however, that the *Schizomycetaceæ*, or unicellular fungi, or lower fungi, or bacteria, are without chlorophyll and generally without chromatophores, and it is therefore doubtful whether it is correct to classify them with the Algæ, as is usually done. They are believed, however, to have derived from the Cyanophyceæ, or Blue-Green Algæ. They may be defined as Thallophyta without chlorophyll, starch or chromatophores, and with a vegetative body, which is usually composed of a mass of filaments, or "mycelium." The mycelial filaments or threads are also known as *hyphæ*, and may be of very different shape, length, and breadth; they may be straight, variously bent, septate or non-septate. These organisms being unprovided with chlorophyll cannot make use for their nutrition of the carbon-dioxide of the air; they derive their carbonaceous food material from complex organic matter, often decaying matter. Fungi may be *saprophytic* or *parasitic*; the same fungus may at times be a saprophyte, at other times a true parasite.

Reproduction.

The seeds of the higher plants may be said to be represented in the fungi by the roundish or oval bodies known by the generic term spores, of which there are a number of types, some sexual, some asexual (see Figs. 1, 2, 3). The principal ones are the following:—

1. *Gonidia* (endospores, spores *sensu stricto*).—These take origin inside a special receptacle called *sporangium*, which is frequently terminal and aerial. When the

FIG. 1.



Types of ascospores. 1, Saccharomyces; 2-4, Willia; 5, Debaryomyces; 6, Schlönnionmyces; 7, Saccharomycopsis; 8, Monospora; 9, Nematospore (after Guilliermond).

spores are 2, 4, 8, or a multiple of 8, they are generally called ascospores, and the cell or spore-case structure containing them is known as an *ascus*.

2. *Zygospores*.—These spores result from a conjugation or modified sexual act between the two special club-shaped hyphal processes (gametes), which are similar in shape and do not show any apparent sexual differentiations; the gametes come into contact and unite, forming a large cell with a very resistant double wall, called *zygospore*.

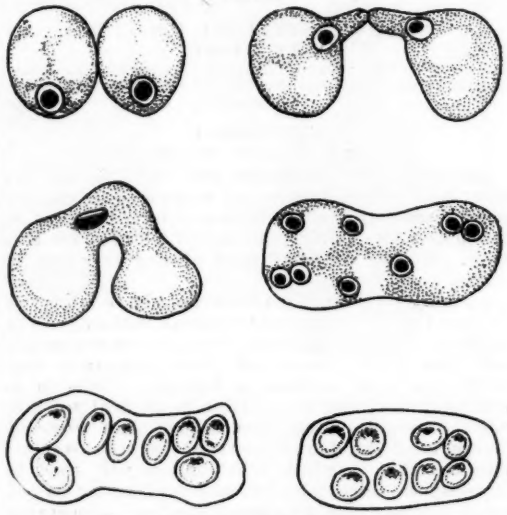
FIG. 2.

Zygospore formation in *Rhizopus nigricans*.

3. *Oöspores*.—These result from a complete sexual conjugation between sexually differentiated elements—a female element (oösporangium, oögonium) and a male element. The female element, *oösporangium* or *oögonium*, has a thick capsule with several pores, and contains some roundish protoplasmatic masses, female gametes, macrogametes, or oöspheres. The *male element* (male gamete, antheridium), which originates on a special delicate hypha, comes into contact with the oösporangium sending a protoplasmatic process through it. In some cases the antheridium divides into several motile bodies—spermatozoids, antherozoids—which fertilize the female gametes.

4. *Conidia* (Exospores).—These are asexual spores. They are roundish or oval, occasionally spirally shaped bodies, which take origin from the mycelial threads by a process of budding or septation or abstriction, and may be simple or divided by septa. They are at first unicellular (Fig. 4), but later a process of division may set in, and they may become pluricellular. Conidia may be pedunculated or non-pedunculated, lateral or terminal. Two principal types of conidium may be distinguished, the true conidium and the *aleuriospore*. True conidia are easily detached from the mycelial hyphæ bearing them, and when they have become free they originate new spores by a process of budding, or give rise to mycelial filaments by germination. True conidia are incapable of forming new spores or new mycelial threads while they remain attached to the parent mycelium. The mycelial hypha which carries the conidia is termed *conidiophore*, or *Sporophore*; a *phialide* is a flask-shaped segment interposed between the sporophore and the conidia; a *prophialide* is a

FIG. 3.

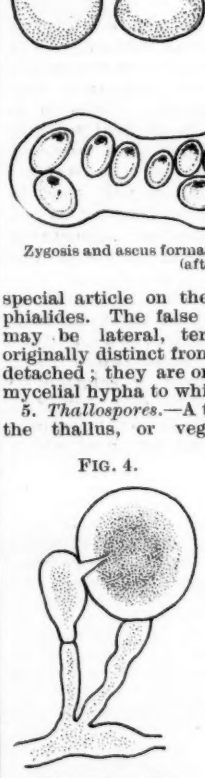


Zygosis and ascus formation in *Zygosaccharomyces octosporus* (after Guilliermond).

special article on the Sporophore supporting several phialides. The false conidia, or *aleuriospores*, which may be lateral, terminal, or intercalary, are not originally distinct from the thallus, and are not easily detached; they are only set free by the death of the mycelial hypha to which they are attached.

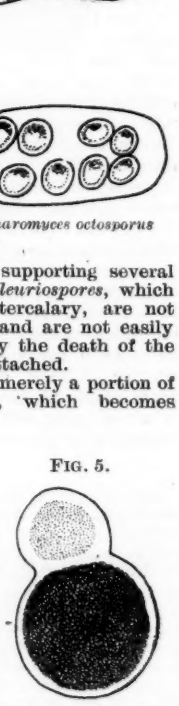
5. *Thallospores*.—A thallospore is merely a portion of the thallus, or vegetative body, which becomes

FIG. 4.



Oöspore formation.

FIG. 5.



A blastospore (after Vuillemin).

secondarily adapted to the purposes of reproduction. There are several varieties of thallospores, the principal ones being: the *Blastospore* (Fig. 5), oval or roundish, formed by a process of budding. The *Arthrospore*, formed simply by the segmentation and disarticulation of a hyphal element or mycelial thread; it is at first square, and later becomes roundish or oval. The *Chlamydospore*. This is merely an arthrospore of large size undergoing encystment.

6. *Hemispores*.—The mycelial hypha becomes differentiated, forming an ampulliform structure called "protoconidium," which later divides into several

segments or "deuteroconidia," which are the true reproduction spores.

Classification.

Fungi may be separated into two large divisions: the *Myxomycetes* characterised by the vegetative body being under the form of a multinucleate naked plasmodium; and the *Eumycetes* characterised by the vegetative body being generally filamentous. Fungi parasitic of man are found only in the second division (Eumycetes), which may be subdivided as follows:—

Eumycetes.
- Class I.—*Fungi Imperfecti.* Mycelium septate. No ascospores.
- Class II.—*Ascomycetes.* Mycelium septate when present. Ascospores.
- Class III.—*Basidiomycetes.* Mycelium septate. Basidiospores.
- Class IV.—*Phycomycetes.*—Mycelium non-septate in vegetative stage.

A. *Fungi Imperfecti.*

The Class *Fungi imperfecti*, Fuckel, 1869, is most important from a medical point of view. It may be subdivided into: (*a*) *Deuteromycetes*, Saccardo, 1886 (accessory fructifications present); and (*b*) *Hyphales*, Vuillemin, 1910 (accessory fructifications absent). Only the latter group contains fungi parasitic on man. It may be claisified as follows:—

***Hyphales*, Vuillemin (= *Hyphomycetes*, Fries).**
- Order I.—*Microsiphonales*, Vuillemin, 1910 (hyphæ bacilliform).
- Order II.—*Thallosporales*, Vuillemin, 1910. (Reproduction by thallospores.)
- Order III.—*Hemisporales*, Vuillemin, 1910. (Reproduction by hemispores.)
- Order IV.—*Conidiosporales*, Vuillemin, 1910. (Reproduction by conidia.)

The Order *Microsiphonales* contain two families: the *Mycobacteriaceæ*, Miche, 1909, in which no definite mycelium is observed, and the *Nocardiaceæ*, Castellani and Chalmers, 1918, in which a definite mycelium is present.

The *Mycobacteriaceæ* are generally classified with the bacteria and not with the higher fungi, and contain five principal genera: Genus *Mycobacterium*, Lehmann and Neumann; *Leptothrix*, Kützing; *Cladothrix*, Cohn; *Vibriothrix*, Cast.

The *Nocardiaceæ* contain two genera: *Nocardia*, Toni and Trevisan, which grows aerobically, is easily cultivated and produces arthrospores; *Cohnistreptothrix*, Pinoy, which is difficult of cultivation, mostly anaerobic and does not produce arthrospores.

The Order *Thallosporales*, Vuillemin, 1910, are divided into two Sub-orders: the *Blastosporineæ*, in which reproduction takes place by means of blastospores, and the *Arthrosporineæ*, in which reproduction takes place by arthrospores.

The Sub-order *Blastosporineæ* contain five principal families: 1. The *Cryptococcaceæ*, Kützing. The hyphæ are hardly different from the conidia, both being yeast-like; conidia not arranged in chains. 2. The *Oösporaceæ*, Saccardo. Some long hyphæ present, spores typically in chains. 3. The *Enantiothamnaceæ*, Chalmers and Archibald—conidia arranged verticillately around the septa of the mycelial hyphæ. 4. The *Haplographiaceæ*—when living parasitic conidia are collected in grape-like masses. The *Cladosporiaceæ*, Saccardo—conidia solitary or in chains.

The Sub-order *Arthrosporineæ* contains a very important family, the *Trichophytonaceæ*, Vuillemin, in which reproduction takes place by Arthrospores; long hyphæ are present in cultures. These fungi are often parasitic of hair. This family includes a large number of genera, including Trichophyton, Microsporon, and Achorion. It is to be noted, however, that many authorities consider these fungi to belong to the Ascomycetes (family Gymnoascaceæ) and not to the *Fungi imperfecti*.

The third Order of the *Hyphales*, the Hemisporales, are characterised by reproduction taking place by hemispores; here the mycelium is composed of abundant hyphæ, which are thin, but always more than 1 micron in diameter. The conidiophores are branched, each branch terminating in ampulliform structure preceded by an annular construction produced by a rigid thickening of the wall. This ampulliform structure is called protoconidium. The protoconidium after a time divides into a number of sporiform segments (deuteroconidia).

The fourth Order *Conidiosporale*, which, as already stated, reproduced by means of conidia, contains four principal Sub-orders: 1. The *Aleurosporineæ*, Vuillemin, 1914. Reproduction takes place by aleurospores. 2. The *Sporotrichineæ*, Vuillemin, 1910, reproduction by true conidia, but true conidiophores are absent. 3. The *Sporophoralineæ*, Vuillemin, 1910, reproduction takes place by true conidia borne on true conidiophores. 4. The *Phialidineæ*, Vuillemin, 1910, reproduction by true conidia borne on phialides.

B. CLASS II.—*Ascomycetes.*

The fungi belonging to this class, as already mentioned, are characterised by reproduction taking place by means of ascospores (gonidia endospores), which originate inside special cells called asci. The Ascomycetes contain three very important families:—

(*a*) The *Saccharomycetaceæ*, Rees, 1870, mycelium only slightly developed or absent. Asci isolated, not differentiated from vegetative cells.

(*b*) The *Endomycetaceæ*, mycelium well developed.

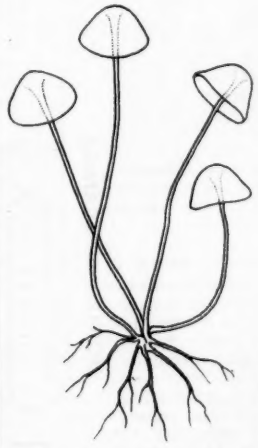
(*c*) The *Aspergillaceæ*, asci generally contained in a globose hollow structure (perithecium), with a terminal opening or pore. Compact peridium.

All these families contain important fungi parasitic of man.

C. CLASS III.—*Phycomycetes.*

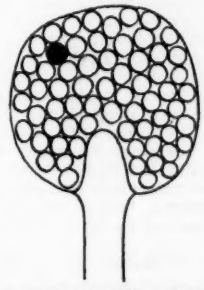
The Phycomycetes, which are characterised by the mycelium being continuous — non-septate — in the vegetative stage, contain several families, one of which, the *Mucoraceæ*, has organisms parasitic of man. The fungi belonging to this family have a branching mycelium with *aerial* branches (gonidiophores), each of which supports on its distal extremity a globular, pear-shaped, or claviform sporangium, called *gonidangium*, which is at first separated from the gonidiophore by a septum. This septum later protrudes into the lower portion of the sporangium and forms a variously shaped structure known as columella. By free cell-formation gonidia develop inside the sporangium. The sporangial protoplasm not used in the formation of the gonidia is transformed into a peculiar mucilaginous substance which later dries up and is the cause of the sporangium bursting. Each gonidium which has become free gives rise by germination to a mycelial filament. There is also at times a sexual mode of reproduction consisting in the conjugation of undifferentiated non-motile gametes, with formation of zygospores. When growing in unfavourable media numerous species reproduce only by conidia and chlamydospores.

FIG. 6.



Rhizopus niger, Ciaglinski and Hewelke.

FIG. 7.



Type of sporangium found in Genus *Rhizopus*.

The family *Mucoraceæ* contains a number of genera, among which the following have species parasitic of man (see Figs. 6 and 7): 1. *Mucor*, Micheli; mycelium ramified, rhizoids (slender root-like filaments) absent.

2. *Rhizomucor*, Lucet and Constantin; rhizoids present, columella ovoid. 3. *Rhizopus*, Ehrenberg; rhizoids present, columella mushroom-like. 4. *Lichtheimia*, Vuillemin; peduncle supporting sporangium ends in a special formation encircling the base of the columella. Diseases due to the fungi of the family *Mucoraceæ* are often called "mucormycoses."

Certain Biological and Biochemical Characters of Fungi.

The *biological* and *biochemical* characters of fungi are very interesting, and of great practical importance. Recent investigations have shown numerous analogies with the lower fungi (bacteria), as regards production of toxins, and especially as regards serological reactions developing in inoculated animals.

About 20 years ago, the late Dr. A. Macfadyen, Director of the Lister Institute, inoculated rabbits with cultures of a saccharomyces and observed a production of specific agglutinins in the blood for the particular species he had inoculated. These results were confirmed and enlarged, using other fungi, by G. H. Rogers, Concetti, Quarelli, &c., and Widal and Abrami have described a general diagnostic method, "sporo-agglutination method," based on the observation that patients suffering from mycological diseases contain specific agglutinins for the spores of the causative fungi. In my experience, however, in many cases, in addition to specific agglutinins, there is present also a large amount of non-specific ones, and this generally detracts from the usefulness of the method.

As regards *toxins*, Auchair and Verliac have obtained a toxic product soluble in ether from *Nocardia bovis*, which they called "actinimycetine." Ceni, Besta, and other observers have extracted various toxins from fungi of the genus Aspergillus, and believe them to be the cause of pellagra. Charrier, Roger, and others have extracted toxins from fungi of the genus Monilia.

Vaccines have been prepared using cultures of Monilias killed by heat, or by carbolic acid by Ashford, Taylor, and others. Plato has prepared a trichophyton vaccine by killing cultures of various trichophytons by heat and triturating them. When injecting this vaccine in patients affected with ringworm, he has observed a general reaction similar to that induced by tuberculin in tuberculous patients. A cuti-reaction in patients suffering from sporotrichosis has been described by De Beurmann.

Biochemical Changes Induced by Fungi.

Certain fungi may induce profound chemical changes, and are of great importance in agriculture and industry. Everyone knows the rôle played by organisms of the family *Saccharomycetaceæ* in alcoholic fermentation and in the production of wine and beer. Certain fungi ferment a large number of sugars and other carbohydrates, others a few or none. I have happened to find a group of monilias which very rapidly split a substance generally considered to be non-fermentable—viz., inulin.

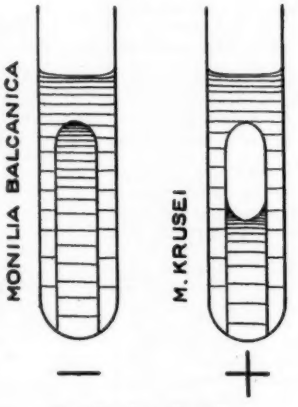
Mycological Method to Detect Various Carbohydrates.

As well known, the property certain fungi have of fermenting glucose has been used for many years as a method of routine to detect this sugar in the urine. In this connexion I may perhaps be allowed to describe briefly a mycological method for the detection of other sugars and carbohydrates which I theoretically devised some years ago, but only recently worked out experimentally, jointly with Dr. F. E. Taylor, in Professor Hewlett's institute. It may, perhaps, be of some slight interest to give here some details of this method and make it better known.

As already stated, for many years so-called German yeast (baker's yeast, brewer's yeast) has been used for the detection of glucose, but this is the only substance for which so far such method of detection has been employed in pathological investigations, and, as a matter of fact, this method of finding glucose (although considered specific in some text-books on pathology) is inexact, because Taylor and myself have shown that German yeast ferments as a rule, not only glucose, but also lævulose, galactose, maltose, saccharose, and sometimes even lactose. If a specimen of urine undergoes fermentation after the addition of German yeast it does not mean, therefore, that this urine contains glucose; it might contain lævulose or galactose, or maltose or saccharose, or even lactose, &c. To detect and determine with certainty glucose it is necessary to use an organism which will split only this sugar and no other. We have such an organism in *M. balcanica*, Cast., which does not ferment any substance apart from glucose. As regards detection and identification of other sugars such as maltose, galactose, &c., I do not know of any fungus which will select only one of the carbon compounds to the exclusion of all others, a fungus which will ferment, for example, only maltose, or only galactose, or only inulin, or only lactose, &c. These various substances, however, may be identified by using two or more fungi, and comparing their action on the substance to be determined. The simplest way of carrying out the method to determine whether a substance is or is not a certain carbohydrate, is to test on the substance whenever possible the action of two germs known to be identical in all their fermentative reactions except on that particular carbohydrate. For instance, in order to see whether a given chemical substance is maltose, the substance may be tested with two organisms identical in all their biochemical reactions, except their action on maltose, one fermenting it, the other not. I shall make a few examples—viz., the determination of lævulose, maltose, galactose, lactose, saccharose, inulin.

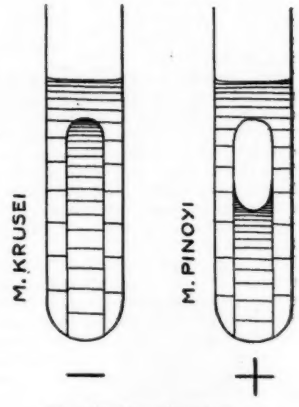
Determination of lævulose.—Let us assume we want to determine whether a certain substance is lævulose.

FIG. 8.



Identification of lævulose.

FIG. 9.



Identification of maltose.

A 1 per cent. sterile solution of the substance is made in sugar-free peptone water, and distributed into two tubes (Nos. 1 and 2), each containing a fermentation tube. No. 1 is inoculated with *Monilia krusei*, Cast., and No. 2 with *Monilia balcanica*, Cast. (see Fig. 8). The tubes are incubated at 35° C. for 48 hours, and the results are then read. If No. 1 tube (*Monilia krusei*, Cast.) contains gas, and No. 2 tube (*Monilia balcanica*, Cast.) contains no gas, the substance is lævulose. This is easily understood by keeping in mind the following facts: *Monilia krusei* ferments only glucose and lævulose; *Monilia balcanica* ferments only glucose. The substance we are testing having been fermented by *Monilia krusei* must therefore be either glucose or lævulose, but as it is not fermented by *Monilia balcanica* it cannot be glucose, which is always attacked by that fungus: it can, therefore, only be lævulose.

Determination of maltose.—A 1 per cent. sterile solution is made in sugar-free peptone water of the substance which we wish to ascertain whether it is maltose. The solution is distributed into two sterile tubes, which are labelled Nos. 1 and 2 (see Fig. 9). No. 1 tube is inoculated with *Monilia pinoyi*, Cast., and No. 2 with *Monilia krusei*, Cast. If after 48 hours' incubation at 35° C. No. 1 (*Monilia pinoyi*) contains gas, and No. 2 (*Monilia krusei*) does not, the substance is maltose. This is explained by the fact that *Monilia pinoyi*, Cast., ferments only three carbon compounds I know of—glucose, lævulose, maltose; *Monilia krusei* ferments only two—glucose and lævulose. The substance being fermented by *M. pinoyi* might be either glucose or lævulose or maltose; but it is not fermented by *M. krusei*; it cannot therefore be glucose or lævulose, and there remains only one possibility, it must be maltose.

Identification of galactose.—Same technique, but No. 1 tube is inoculated with *Monilia metalondinensis*, Cast., and No. 2 tube with *Monilia pinoyi*, Cast. If after 48 hours' incubation at 35° C. No. 1 tube (*M. metalondinensis*) contains gas and No. 2 tube (*M. pinoyi*) does not, the substance must be galactose. The explanation lies in the fact that *M. metalondinensis* ferments the following four carbon compounds only (glucose, lævulose, maltose, galactose), while *Monilia pinoyi* ferments only glucose, lævulose, and maltose. The substance being fermented by *Monilia metalondinensis*, there are four possibilities: it may be glucose or lævulose, or maltose, or galactose, but is not fermented by *M. pinoyi* (which attacks glucose, lævulose, and maltose); it cannot, therefore, be glucose, nor lævulose, nor maltose; it can only be galactose.

Determination of lactose.—Same technique as for the determination of the carbohydrates already mentioned, but instead of using micro-organisms belonging to the higher fungi, bacteria may be used. The substance to be identified is made into a 1 per cent. sterile solution of peptone water and distributed into two tubes, Nos. 1 and 2. Tube No. 1 is inoculated with *B. pseudoasiaticus*, Cast., and tube No. 2 with *B. pseudocoli*. If after 48 hours' incubation at 37° C. tube No. 1 (*B. pseudoasiaticus*) does not contain gas, while tube No. 2 (*B. pseudocoli*) contains gas, the substance must be lactose, because *B. pseudoasiaticus* and *B. pseudocoli* are absolutely identical in all their fermentative characters except as regards lactose, which is not attacked by *B. pseudoasiaticus*, and is, on the other hand, fermented with production of gas by *B. pseudocoli*.

In practice, if it is known beforehand that the substance to be determined is Fehling-reducing, two bacilli found in every laboratory may be used—viz., *B. paratyphosus B* and *B. coli*. If a Fehling-reducing substance is not fermented by *B. paratyphosus B*, and is fermented by *B. coli*, it is lactose. Why? Because the two germs, as regards fermentation of Fehling-reducing substances, differ only in their action on lactose. *B. paratyphosus*, as well known, does not ferment it, while *B. coli* ferments it.[1]

Determination of saccharose.—A 1 per cent. solution of the substance suspected to be saccharose is made in sugar-free peptone water, and some of the solution is placed into tubes Nos. 1 and 2. Tube No. 1 is inoculated with *Monilia tropicalis*, Cast., and tube No. 2 with *Monilia metalondinensis*, Cast. If gas develops in tube 1 (*Monilia tropicalis*) and not in tube No. 2 (*Monilia metalondinensis*) the substance is saccharose. This is easily understood if the following facts are kept in mind. *Monilia tropicalis* ferments only the following carbon compounds: glucose, lævulose, maltose, galactose, saccharose. *M. metalondinensis* only the following four carbon compounds: glucose, lævulose, maltose, galactose. If a substance is fermented by *M. tropicalis*, there are therefore five possibilities: it may be glucose or lævulose, or maltose, or galactose, or saccharose: but if the same substance is not fermented by *M. metalondinensis*, it cannot be glucose, or lævulose, or maltose, or galactose, and must therefore be saccharose.

To the above purely mycological method a chemico-mycological formula, useful in practice, may be added:

Fehling ... ... $\left.\begin{matrix}-\\+\end{matrix}\right\}$ = **Saccharose.**
Monilia tropicalis, **Cast.**

This is explained by the fact that *M. tropicalis*, Cast., ferments with production of gas, glucose, lævulose, maltose, saccharose, and no other substance. If Fehling is negative it cannot be any of the first three substances, as they are all Fehling-reducing, and it must therefore be saccharose.

Determination of inulin.—Same technique as for saccharose, but tube No. 1 is inoculated with *Monilia macedoniensis*, and tube No. 2 with *Monilia rhoi*. If gas appears in tube No. 2 (*M. rhoi*) the substance is inulin. This is easily understood if one bears in mind the fact that *M. macedoniensis* and *M. rhoi* are identical in all their fermentative reactions except in inulin, which is fermented by *M. macedoniensis*, but not by *M. tropicalis*. If a substance, therefore, is fermented with production of gas by *M. macedoniensis* and not by *M. rhoi* it must be inulin.

Presence of More than One Fermentable Substance.

If more than one sugar or other fermentable carbon compound is suspected to be present, this may to a certain extent be ascertained and the various fermentable substances determined by the mycological method. Let us assume that a liquid after gas fermentation with *Monilia balcanica*, Cast., is still fermentable with production of gas by *Monilia krusei*, Cast., the conclusion is that in addition to glucose the liquid contained lævulose; of course, care should be taken to use strains of *Monilia balcanica* and *Monilia krusei*, having approximately the same fermentation power on glucose. If now the liquid after exhaustion first with *Monilia balcanica*, Cast., and then with *Monilia krusei*, Cast., is fermentable with production of gas by *Monilia pinoyi*, Cast., the presumption is that, in addition to glucose and lævulose, maltose was present, and this is easily understood if we remember that *Monilia balcanica* produces gas in glucose only. *Monilia krusei*, Cast., in glucose and lævulose, and *Monilia pinoyi*, Cast., in glucose, lævulose, and maltose.

Use of the Mycological Method in Urine Analysis.

With Dr. F. E. Taylor I have carried out a number of experiments, adding to samples of urine various sugars and other carbohydrates, and also examining a certain number of pathological urines. The conclusion we have come to is that the method can be used in urine analysis with advantage, especially in the detection of glucose, lævulose, maltose, galactose, lactose, and pentoses. A point of great importance is that the urine should be aseptic; if it cannot be collected aseptically it should be sterilised as soon as possible, after distribution in the tubes, in Koch's steamer for 30 minutes on two consecutive days. It should never be autoclaved, as this procedure may alter the characters of the sugars present. A portion of the urine is distributed in five sterile tubes, each containing a Durham's fermentation tube. A third or equal amount of sugar-free peptone water should be added to the urine, otherwise the fungi may grow very scantily and there may be no production of gas. The five tubes, plugged with sterile cotton-wool, are inoculated one with *Monilia balcanica*, one with *Monilia krusei*, one with *Monilia pinoyi*, one with *Monilia metalondinensis*, one with *B. paratyphosus*, and one with *B. coli*.

Addendum.

Unfortunately some months ago an accident, the catching fire of the 20° C. incubator in which the collection of monilias was kept, destroyed a number of important strains, including *Monilia balcanica*, Cast., which is specific for glucose. At the present time only the following monilias with permanent fermentative reactions are available for urine analysis, *Monilia krusei*, Cast. (ferments with production of gas, glucose, and lævulose), *Monilia tropicalis*, Cast. (ferments with production of gas, glucose, lævulose, maltose, galactose,

[1] It is often stated in text-books that if a urine reduces Fehling and is not fermented by ordinary Baker's yeast (German yeast) the reducing substance is lactose. There are, however, two important sources of error: first, quite a number of specimens of German yeast ferment lactose; second, even if the German yeast should not ferment lactose this is not the only Fehling-reducing substance which may not be fermented by baker's yeast—the pentoses, for instance.

and saccharose), *Monilia macedoniensis*, Cast. (ferments, with production of gas, glucose, lævulose, galactose, saccharose, and inulin). However, even with three species, in conjunction with *B. paratyphosus B* and *B. coli*, several carbohydrates can be detected and identified, as shown by the following formulæ:—

Monilia krusei, Cast.	+	= Glucose or lævulose.
Monilia macedoniensis, Cast.	0	= Maltose.
Monilia tropicalis, Cast. ...	+	
Monilia macedoniensis, Cast.	+	= Inulin.
Monilia tropicalis, Cast. ...	0	
Monilia krusei, Cast.	0	= Galactose.
Monilia macedoniensis, Cast.	+	
Monilia tropicalis, Cast. ...	+	
B. paratyphosus B, Shott. ...	+	
Monilia macedoniensis, Cast.	+	= Saccharose.
Monilia tropicalis, Cast. ..	+	
B. paratyphosus B, Shott. ...	0	
Monilia tropicalis, Cast. ...	0	= Lactose (most probably, but it might be raffinose or glycerine; test with Fehling; if positive, lactose).
B. paratyphosus B, Shott ...	0	
B. pseudocoli, Cast....	+	
Monilia tropicalis, Cast. ...	0	= Pentoses (if Fehling, positive).
B. paratyphosus B, Shott	+	
B. coli	+	

+ = presence of gas. 0 = absence of gas; acid fermentation is not taken into account.

For urine analysis it is advisable to use as a matter of routine a set of five tubes, one inoculated with *M. krusei*, one with *M. macedoniensis*, one with *M. tropicalis*, one with *B. paratyphosus B*, and one with *B. pseudocoli*. The results may be arranged as follows:—

Monilia krusei, Cast.	+	= Glucose (or lævulose).
Monilia macedoniensis, Cast.	+	
M. tropicalis, Cast.	+	
B. paratyphosus B, Shott ...	+	
B. pseudocoli, Cast....	+	
Monilia krusei, Cast.	0	= Maltose.
M. macedoniensis, Cast. ...	0	
M. tropicalis, Cast....	+	
B. paratyphosus B, Shott ...	+	
B. pseudocoli, Cast....	+	
M. krusei, Cast.	0	= Galactose.
M. macedoniensis, Cast. ...	+	
M. tropicalis, Cast....	+	
B. paratyphosus B, Shott ...	+	
B. pseudocoli, Cast....	+	
M. krusei, Cast.	0	= Lactose (most probably, but it might be raffinose or glycerine; test with Fehling; if positive, lactose).
M. macedoniensis, Cast. ...	0	
M. tropicalis, Cast....	0	
B. paratyphosus B, Shott ...	0	
B. pseudocoli, Cast....	+	
M. krusei, Cast.	0	= Pentose (provided Fehling be positive).
M. macedoniensis, Cast. ...	0	
M. tropicalis, Cast....	0	
B. paratyphosus B, Shott ...	+	
B. pseudocoli, Cast....	+	
M. krusei, Cast.	0	= Saccharose.
M. macedoniensis, Cast. ...	+	
M. tropicalis, Cast....	+	
B. paratyphosus B, Shott ...	0	
B. pseudocoli, Cast....	+	
M. krusei, Cast.	0	= Inulin.
M. macedoniensis, Cast. ...	+	
M. tropicalis, Cast....	0	
B. paratyphosus B, Shott ...	0	
B. pseudocoli, Cast....	0	

+ = presence of gas. 0 = absence of gas; acid fermentation without production of gas is not taken into account.

I venture to think that this method, when more generally known, will, perhaps, be found useful in the detection of those sugars and carbohydrates the identification of which is long and laborious when made by purely chemical methods.

Having to-day referred to the morphological characters of fungi and their classification, as well as, though very incompletely, to their biological and biochemical properties, I propose, with your permission, to deal in the next lecture with fungi as specific causes of disease.

Dr. A. T. Scott, M.B.E., Assistant Commander, Y Division Metropolitan Special Constabulary, has been made an Honorary Associate of the Order of St. John of Jerusalem for services to wounded, &c., during air raids.

A REVIEW OF

"HEART" CASES IN THE EGYPTIAN EXPEDITIONARY FORCE, 1916–1918.

BY A. L. KROGH, M.D. EDIN., W. T. RITCHIE, M.D. EDIN., AND E. H. WHITE, M.D. OXON.

DURING a period of two years from November, 1916, 2425 soldiers suffering, or supposed to be suffering, from affections of the heart came under our care in Cairo. Some were men of category B, sent to hospital from garrison battalions or from area employment companies; but the vast majority belonged to category A, and had gone sick while with their units in the Sinai Desert, in the maritime plain of Palestine, in the Judæan Hills, or in the Jordan Valley. Many, and particularly those observed during the winter of 1916–1917, had previously seen service in Gallipoli. The nature of the campaign in Egypt and in Palestine offered abundant possibilities for the development of cardiac affections. The prolonged desert campaign, its weary monotony unbroken by leave even to the base, or unrelieved for weeks by letters from home, and the strain of marching and of fighting, ankle deep in sand, while exposed to the heat of the sun and the glare of the desert, and with a scanty water-supply, afforded a stiff test of endurance. Moreover, acute infective diseases were prevalent, especially malaria, enteritis, bacillary and amœbic dysentery, diphtheria, sand-fly fever, enteric, paratyphoid, and relapsing fever of the European and of the Palestine forms. Typhus, and jaundice apart from malaria, were not frequent; trench fever and dengue were practically not-existent.

Other Diseases.

Amidst the stress of work there was a tendency when disposing of men who, although unfit, had no organic disease of the heart, to base the diagnosis upon the obvious sign of an unduly rapid pulse, while they might in reality be suffering from malaria, chronic dysentery, anæmia, bronchitis, pulmonary tuberculosis, or other disease. Our general principle was to search for the basal disease and not to retain a diagnosis of D.A.H. unless that search—including, if necessary, an examination of the blood, of the fæces, and of the sputum, a screen examination of the chest, a diagnostic injection of tuberculin, and other methods—had failed to establish a diagnosis. "Other diseases" constituted 12·4 per cent. of the total 2425 cases. An analysis of 1132 cases admitted with a diagnosis of D.A.H. shows that 185 (16·3 per cent.) were suffering from "other diseases." Physical examination and the response to effort warranted a diagnosis of "No appreciable disability" in 36 (3·2 per cent.). In some of these men there may have been a disability which we failed to detect, or it may have passed away during the period between the evacuation of the men from their units and their arrival at hospital; but a considerable number had certainly no disability. A man reported sick with scabies, a sprained ankle, mild diarrhœa or other complaint, and subsequently a physiological irregularity of the pulse, or some slight deviation from the assumed standard of the cardiac sounds, was mistaken for a sign of heart disease. We have no hesitation in saying that faulty diagnosis was responsible for the transfer to hospital of many men who had no cardiac disability. Further, in many men admitted as V.D.H. or as D.A.H. the

symptoms were trivial, and yet they had become profoundly impressed by the belief of the heart being seriously diseased.

In 149 (13·1 per cent.) of 1132 cases admitted as D.A.H. we diagnosed debility in 32, the condition being usually that of convalescence from dysentery, diphtheria, or other acute infective disease, bronchitis in 15, neurasthenia in 12, phthisis in 11, anæmia in 11, malaria in 8, sand-fly fever in 6, diphtheria, pulmonary emphysema, and myalgia (each) in 4, tubercle of the lung, pleurisy, and dysentery (each) in 3. "Other diseases" of lesser frequency were tonsillitis, dilatation of the stomach, diarrhœa, paratyphoid, adenoids, asthma, congestion of the lung, disseminated sclerosis, multiple (post-diphtheritic) neuritis, hysteria, epilepsy, astigmatism, exophthalmic goitre, myxœdema, obesity, nephritis, gonorrhœa, secondary syphilis, P.U.O., kyphosis, rheumatic fever, inflammation of joints, varix, flat-foot, and cancer.

The diagnosis of phthisis or of tubercle of the lung was sometimes easy. For example:—

A lance-corporal, aged 24, a motor-driver in civil life, had been in hospital twice for bronchitis during his three and a half years of service before he was admitted as D.A.H. He complained of shortness of breath, cough, expectoration, and giddiness; the pulmonary physical signs were distinct and the sputum contained tubercle bacilli.

Another patient, aged 20, and formerly a tailor, had suffered from relapsing fever after being overseas for 15 months, and thereafter had never been wholly fit. Sixteen months later, complaining of weakness, palpitation, and shortness of breath, he was admitted as D.A.H. He was anæmic, the apex of the left lung was consolidated, and he lost 11 lb. in weight while in hospital.

Other cases were less definite, having tachycardia and signs of a quiescent pulmonary lesion, but had not lost weight and did not react to 0·001 c.cm. of tuberculin (T.O.); and in some instances the true diagnosis was not established until several months after D.A.H. had first been diagnosed.

One man, aged 20, formerly a bank clerk, was under our care for seven weeks during the summer of 1917, and was discharged as fit for category A. Six months later he was readmitted as D.A.H., complaining of shortness of breath and giddiness. At rest his pulse-rate was 78, after exertion 120, and five minutes later the rate was still 120. Ten months after his disability was first diagnosed as D.A.H.; the right apex showed signs of consolidation.

Examinations and Tests.

All the men, with few exceptions, were admitted to a general hospital, and many arrived as cot cases. We realised that a prime essential in treatment was the restoration of the man's confidence in his heart. A brief examination of his colour, of his breathing, and of his pulse as he lay on the stretcher having satisfied us that he had no serious heart failure, irrespective of what the cardiac lesion might be, he was asked to rise and walk to the ward. Thus the first step towards recovery was made. In our subsequent examination an inquiry, as full as possible, was made of the man's symptoms, of his habits in civil life, of antecedent diseases, and particularly of acute or chronic infections. The respiratory, the nervous, and other systems were examined before a detailed examination was made of the circulatory system, with the object of excluding diseases other than those of this system.

The men were examined in the recumbent and in the erect postures, before and after exercise. In determining the size of the heart we relied more on the situation of the apex-beat than on the percussion dullness of the heart. Postural variations in the character of the cardiac sounds and murmurs were always noted. For example, the disappearance of a basal systolic murmur on change of posture reveals its functional origin. Again, in mitral stenosis the characteristic murmurs may be obscure until the patient is erect and leaning forward, or they may not be heard clearly until he lies on his left side. The value of exercise in intensifying cardiac murmurs is best illustrated in mitral stenosis, and in the mitral and tricuspid incompetence of cardiac dilatation. Respiratory irregularity of the pulse was often observed, especially in men below 30 years of age. In those over 30 this irregularity was often associated with a recent infection or with a neurosis. This irregularity was not an absolute criterion of the men's tolerance of effort, more especially in cases of neurosis or if the pulse-rate at rest exceeded 90. In men with a history of recent infection a respiratory irregularity of the pulse was likewise no criterion of the immediate tolerance of effort, but it afforded a basis for confidence in anticipating complete recovery and return to duty. The pulse-rate was taken in the recumbent and in the erect postures, and a note made of symptoms, such as blurred vision, giddiness, and præcordial uneasiness on rising from the couch.

Men who had developed D.A.H. in the early stages of convalescence from diphtheria, dysentery, or other acute infection were not submitted to any tests or course of training until their general health was substantially restored. After the first few weeks of convalescence, however, a course of mild physical exercises was of great benefit. Except in those acute cases the men were never confined to bed, but were up and attending dining-hall, and they were given as much liberty as possible. Having been examined they were tested as soon as possible after their admission to hospital.

The initial test of the heart's capacity for exertion varied according to the man's physical condition, but the usual standard test was that of walking 50 yards and doubling back. In the more obviously distressed men and in those with pronounced tachycardia milder initial tests were employed, such as swinging of the arms and skipping 20 times. In the evaluation of the response to effort we particularly noted the pulse-rate after exertion, its period of decline, which should not exceed 2 minutes, pallor, dyspnœa, distress, palpitation, pain, and development of cardiac murmurs and extrasystoles. According to the nature of the response the reaction was noted as good, fair, or poor. If the pre-exertion rate was over 90 the reaction was seldom wholly satisfactory at the outset. In a considerable number the pulse-rate two minutes after the test exercise was less than the pre-exertion rate; in the absence of dyspnœa and other symptoms this was a favourable sign, and indicated that improvement would accrue from a course of exercises.

Graduated Training.

Within a day or two of admission to hospital the men began a course of graduated physical exercises. The first part of the course, consisting of exercises A to C 1, C 2, of 15 to 30 minutes' duration daily, as detailed in the Report (No. 8) to the Medical Research Committee (1917), was carried out in the hospital. Men who failed to attain the standard of efficiency required for category B III. were invalided home; others who proved fit for B III., but were not likely to be fit for a higher category (for example, men with mitral stenosis and good tolerance of exercise), were classified B III. for sedentary duties, and discharged to their base. The vast majority of the men, however, became fit for half an hour's exercise in groups C 1, C 2, and were then transferred from hospital to a depôt for further testing and training.

During 1917 these men were transferred to a convalescent depôt, where, in addition to half an hour's daily exercise in C 1, C 2, or in D group, they

had a daily march of about half an hour over level ground and at an even pace. Later this was supplemented by route marches of two to six miles thrice weekly, over sandy ground, the men eventually carrying equipment. In 1918 the men were transferred from hospital to a command depôt, where the standard of efficiency demanded of the men approached as closely as possible that required for categories B II., B I., and A on active service. The heart cases were not separated in any respect from others in the depôt, but were exercised and trained along with other men with divers complaints. This was a fundamental principle in treatment, in order to prevent the men from thinking they were special cases, and in order to divert their attention from the heart. Four groups of physical fitness and of training were established in the command depôt. On transfer there most men were placed in the lowest group—namely, in group 4. Here they performed light fatigues, and each morning had two courses of special physical exercises, each of 20 minutes' duration. These exercises, performed under the direction of an expert instructor in physical training, Dr. G. G. Deaver, were characterised by their easy rhythmical motion, graduated both in tempo and in force, and by being carried out to the music of a band. The "heart" cases remained in this group for six days. They were then transferred to group 3, in which the men had, in addition to similar exercises of 30 minutes' duration daily and fatigues, a two-mile route march on alternate days. The duration of stay in this group was ten days, and then the men automatically moved into group 2, in which parades, drill, and Swedish drill were carried out, with longer route marches. After eight days in group 2 the men passed into group 1, in which they had full drills, ceremonial and otherwise, on alternate days; eight-mile route marches, with full equipment, pack and rifle, and bayonet fighting. The period of stay in this highest group was ten days. The average duration of training in the command depôt was consequently about 34 days. In was found inadvisable to allow cases to drag on indefinitely in the depôt. If little or no improvement was obtained in six weeks the man was regraded and discharged to duty in a lower category. It was better that he should be doing useful work in category B II. or B I. than remain in the command depôt in the hope of eventually attaining category A. No man was discharged from the depôts until he had been proved fit for the duty of his category.

The route marches afforded a sound test of the men's capacity for sustained effort, and were a necessary link in the chain of observation, for although a patient might tolerate even the strenuous exercises of D group, he might fail when the test was one of endurance, as demanded by a route march. In such men the phenomena of exhaustion were shown by limpness, fatigue, profuse sweating, laboured breathing, rapid pulse, loss of colour, and a feeling of being "done up." Other men made a poor start, but improved remarkably during the march, and returned in a comparatively fresh condition. Apparent anomalies in the men's response to effort were often observed, for this depended on the quality or nature of the effort demanded. Thus a man may tolerate well a sustained test such as a route march, yet react very poorly to a mild skipping test, to a short sprint, or to tests which involve jerking or sudden postural changes, and consequently sudden variations of arterial and venous pressure in the splanchnic area.

Organic Disease of the Heart.

Of the total 2425 cases 355 (14·6 per cent.) had organic disease of the heart. In all but a few, who had cardiac hypertrophy or chronic myocarditis, the disability was an organic valvular lesion. A loud pulmonary systolic murmur, as the chief abnormal sign, was often noted in men who were anæmic or in whom the heart was dilated, but only one instance of congenital heart disease came under observation.

The case was one of patent ductus arteriosus in a man aged 23, a tailor's cutter in civil life, who had three years and nine months' service, including two years in Gallipoli and in Egypt, before he reported sick with bronchitis. Of the acquired valvular lesions mitral incompetence was more common than all others combined; mitral stenosis was more frequent than aortic incompetence. The lesions were associated with all grades of cardiac reserve force. An infantryman presenting aortic incompetence had two and a half years' service, one year being overseas, and he was fit for full duty until he sprained his ankle; a second, with facial manifestations of congenital syphilis, had for nine months been fit only for light duty in the cook-house; while a third died of acute endocarditis of the aortic valve after seven days' illness. The men with organic disease of the mitral valve likewise differed in their capacity for exertion, and in many this was remarkably good. In illustration we may cite the case of a lance-corporal who had suffered from rheumatic fever nine years previously, but from no subsequent illness, and who had made a desert march of 15 miles six months before he was evacuated to hospital on account of mitral stenosis. But others had long been ailing; for example, a private, aged 37, who had been breathless since he had scarlet fever at the age of 14, and who presented the characteristic signs of mitral stenosis and incompetence.

In the differentiation of mitral incompetence as a result of organic disease from that of cardiac dilatation we relied mainly on a history in civil life of acute infective disease, and particularly of rheumatism, on downward or outward displacement of the apical impulse, and on the quality and persistence of the apical systolic murmur. In the mitral incompetence of cardiac dilatation we usually found a history of a recent acute infection (diphtheria, dysentery, malaria, &c.) and signs of anæmia; the left ventrical was not hypertrophied, there were usually coincident systolic murmurs at the pulmonary and tricuspid areas, and the murmurs lessened or disappeared with rest, to reappear after exertion. Moreover, the murmurs of cardiac dilatation, as a rule, disappeared entirely when the patients' general health was restored, whereas those of organic nature persisted throughout the patients' stay in hospital and in depôt.

In all cases of valvular disease and of cardiac dilatation, except those obviously unfit, the heart's functional capacity was tested in the manner already described. Men with aortic incompetence were invariably invalided home. Most of those with mitral stenosis were found, after a few days' testing in hospital, to be fit for the lighter grades of physical exercise. They were usually classified B III., and discharged to sedentary duties; only a few were transferred to the depôt for further testing and training, for it was seldom considered desirable to place even the fittest of them in a category higher than B III. Most of the men with mitral incompetence were found to tolerate the lower grades of exercise well, and were transferred to the depôt; nearly a half of those transferred were eventually classified B II.

Degeneration of the myocardium and chronic myocarditis were rarely observed, although arterial sclerosis was common in the elderly men of garrison battalions and labour corps. Auricular flutter was observed in only one man.

This patient was 31 years of age, had been a bookmaker's assistant in civil life, and had enjoyed uniformly good health. After ten months' service in France he was wounded in the arm. Seven months

later he was graded B II., and while employed in a supply depôt at Kantara, began to complain of præcordial pain, dizziness, breathlessness, and sleeplessness. The arteries were thickened, the heart was not enlarged, and its sounds were pure; the auricles were fluttering at a rate of 200 per minute, the ratio of auricular to ventricular systole being inconstant. He was never confined to bed, and never had any urgent symptoms during two months' stay in hospital before he could be invalided.

Auricular fibrillation was observed in two cases, but no case of alternation, of heart-block, or of nodal (atrio-ventricular) rhythm came under our care.

Disordered Action of the Heart.

Of the total cases 1774 (73 per cent.) were returned as D.A.H. The symptoms and physical signs of these cases corresponded with those described in other theatres of the war, or with D.A.H. as seen in civil practice, and need not be detailed. Five groups of cases were differentiated: 1. The toxo-metabolic group, with a definite history of infection, and with toxæmia and often disorders of metabolism resulting therefrom. This group was subdivided into: (*a*) Type-general, with widespread toxæmia, lowering of the general health, and the exhaustion syndrome; and (*b*) type-cardiac, with symptoms and signs referable mainly to the circulatory system and its nervous control. 2. Cases with minor degrees of arterio-sclerosis, about 2 per cent. of the total cases. 3. Neurosis. 4. Effects of strain. 5. The immature or untrained heart.

Infection was by far the most potent factor in the ætiology of D.A.H., but neither in the toxic or metabolic group of cases, nor in those in whom the primary disability was a neurosis, were there any signs indicating hyperthyroidism. In a series of 717 cases special inquiry elicited a clear history of acute infection in 41·4 per cent., while 50 per cent. either gave a history of infection or were affected with anæmia, which was probably of infective origin. Of the causal infections, the most frequent were diphtheria (9·4 per cent.), rheumatic fever and chorea (6·7 per cent.), dysentery (3·9 per cent.), bronchitis (3·8 per cent.), malaria (3·1 per cent.), tonsillitis (3·0 per cent.), scarlet fever (2·4 per cent.), pneumonia and enteric (each 1·2 per cent.). In very few of our cases was D.A.H. a sequel of gas poisoning; in none was it caused by trench fever. Of all the common forms of D.A.H., that arising as a late sequel of diphtheria was the most severe, persistent, and intractable. As demonstrating the importance of this disease in the causation of D.A.H., we note that of 531 cases of diphtheria admitted to the hospital in 1917, 12 per cent. developed transient D.A.H. during early convalescence; and that of a total 530 "heart" cases admitted during the period July to December of the same year, 72 (13·5 per cent.) were post-diphtheritic D.A.H. It was not considered advisable to give to cases convalescing from diphtheria any course of training in the hospital. The more severe cases, when semi-convalescent, were transferred to another hospital for further rest; the lighter cases were retained in hospital for not less than six weeks from the onset of the primary disease, and before being transferred to the convalescent depôt they were classified "B III. for two or three months after convalescence." In appropriate cases an entry was made in the man's pay-book of his being unfit for fatigues or for marching. The best treatment of post-diphtheritic D.A.H. is prophylaxis.

D.A.H. was more often post-dysenteric than post-malarial, and the latter was less severe and less persistent, though we occasionally observed acute, and in two instances fatal, heart failure in the course of malignant malaria. Further evidence of the relative infrequency of malaria as a cause of D.A.H. is afforded by the statistics of the medical division of the hospital for 1917, the total admissions for malaria being 1539, as contrasted with 960 for dysentery and 1336 for enteritis and diarrhœa; and also by the returns for 1918 when there were only 1358 cases of dysentery as against 5879 cases of malaria for the first 10 months of the year. Moreover, during the last quarter of 1918, when malaria was most prevalent and severe, D.A.H. was almost a rarity. The explanation of the greater frequency and severity of post-dysenteric D.A.H. is probably the profound toxæmia associated with the intestinal infection of bacillary and of amœbic dysentery. Of 2318 cases of dysentery, 353 (15 per cent.) were amœbic.

Neurosis.—In only 2·5 per cent. of 717 cases of D.A.H. was there a definite history of shell or bomb explosion. In a further 2·3 per cent. the disorder was essentially a neurosis, the most striking examples being in men of Celtic type. Anxiety, tremor, and exaggeration of the tendon reflexes were specially pronounced, the pulse-rate remained persistently high and was unduly accelerated by slight sympathetic stimulation; dyspnœa was trivial or absent even although the respirations were accelerated to three or four times their normal rate. Rest in bed was of no benefit and might even be prejudicial. During their course of training in the depôt the men of the neurosis group presented persistent tachycardia, without dyspnœa or distress, and little or no benefit accrued to them from training. Few of the men of this group became fit from category A, and readmissions to hospital were much more frequent than in the case of other groups. Nevertheless, these men had a genuine disability and were not malingerers.

The effects of strain.—In only a few cases was strain the dominant factor, and even in them there was no certainty of the heart having been altogether normal prior to the stress. The men's ages varied from 20 to 40. Six had indulged in strenuous pursuits; two were sprinters, two bakers, one a rower. All had been remarkably free from infection, and in all but two the symptoms arose after a definite effort greater than had been customary. In about one-third of the cases the heart was slightly enlarged; in two the cardiac impulse was forcible; soft systolic murmurs were common. The average pulse-rate was nearer 90 than 80; effort induced marked acceleration, but the period of decline was, as a rule, normal or only slightly lengthened. Of 17 cases specially noted, 12 were discharged to category A, 5 to category B I.

The immature or untrained heart.—The average age of the men in this group was below 19, and the weight was below normal. The men's habits in civil life had usually been sedentary, and in the army they had been employed as mess waiters, officers' servants, cooks, or clerks, and had not presented symptoms until undergoing the unwonted strain of marching. In response to training improvement was slow but usually satisfactory; about 60 per cent. of these men were discharged to category A.

Extrasystoles were noted in 59 (6·6 per cent.) of 896 cases. The extrasystoles were usually single, occasionally multiple. The ætiological factor was anæmia, probably toxic, in 11, arterio-sclerosis in 7, mitral stenosis in 6, mitral incompetence in 5, recent tonsillitis in 5, rheumatic fever, diphtheria, dysentery (each) in 4, dilatation of the heart, neurosis (each) in 3, gas-poisoning and rheumatic fever, scarlet fever, enteric, pneumonia, malaria, P.U.O. (each) in 1. In 17 of the 59 cases there were signs of organic valvular disease.

Disposal.

Of 2156 men whose ultimate disposal was known, 68 (3·1 per cent.) were invalided home; 5 died. All cases of aortic incompetence and of myocardial degeneration were invalided. Men who were fit only for category B III. were discharged to sedentary duties. In 1917–18 1980 men of all categories were transferred from hospital to depôt, and 69 per cent. of these were ultimately discharged to category A. In 1917 we had 1283 men under our care. 695 (54 per cent.) were discharged as category A, 103 (8 per cent.) as "temporary base," 115 (8·9 per cent.) as B I., 126 (9·8 per cent.) as B II., 168 (13 per cent.) as B III., 16 (1·2 per cent.) as category D (duty in command depôt), 34 were invalided home, 2 died, and 24 were transferred to other hospitals in Egypt. In 1918, when the required standard of fitness was certainly not lower than that

demanded in 1917, our statistics show a higher percentage of return to full duty. 906 men were transferred to the command depot: 773 belonged to category A, 57 to B I., 58 to B II., 18 to B III. These 906 men were disposed of as follows: To category A, 672; to B I., 119; to B II., 91; to B III., 24. Thus of 906 men of all categories transferred from hospital to command depôt 74·4 per cent., and of 773 men of category A 86·9 per cent., were discharged to category A. These figures illustrate the great value of the training in a command depôt.

In 1917 the disposal of 500 men transferred from hospital to a convalescent depôt was specially analysed by one of us (A. L. K.); 340 cases of D.A.H., 180 of the type-general and 160 of the type-cardiac, were reviewed. Of the type-general 80 (44 per cent.) were discharged as category A, 21 as temporary base, 21 as B I., 51 as B II., and 7 as B III. Thus 32 per cent. were discharged to the two lower grades of category B. In the type-cardiac the results were better, 93 (58 per cent.) being discharged as category A, 21 as temporary base, 14 as B I., 26 as B II., and 6 as B III. Consequently, only 18 per cent. were discharged to B II. and B III. In D.A.H. of the type-cardiac the beneficial effects of graduated training were most evident. We often noticed that a man who laboured under discomfort at the beginning of the morning exercises finished comparatively fresh. Progress was, on the whole, more satisfactory than in the type-general, for the percentage of men who attained category A was 58 in the type-cardiac and 44 in the type-general.

In 92 cases of this series of 500 there was organic disease of the heart or arterial sclerosis; 43 (45 per cent.) were also affected with D.A.H. of infective or toxic origin. Of 16 cases of myocardial disease, with a history of recently superadded infection, 7 became fit for B II. and 9 for B III. category; whereas of 12 myocardial cases with a history of long-standing disability but no recent infection, 2 became fit for B I., 8 for B II., and 2 for B III. category. This group also contained 47 cases of valvular disease, practically all being mitral incompetence. Nineteen of these men gave a history of recently superadded infection, and their disposal was: Category A, 3 (15·7 per cent.); temporary base, 1; B II., 13; B III., 2. Thus 79 per cent. attained only B II. or B III. standard. The remaining 28 cases of V.D.H. were of old standing and without any recent infection. Their disposal was: Category A, 6 (21·5 per cent.); B I., 5; B II., 12; B III., 5. Considering the V.D.H. group as a whole, we are forced to recognise the frequent limitation of response to sustained effort. Few of the men attained category A, but the vast majority became fit for B II. or B III. categories.

In 130 men of the series of 500 there was a rheumatic history. Their disposal was as follows: Category A, 34 (26·1 per cent.); temporary base, 10 (7·6 per cent.); B I., 19 (14·6 per cent.); B II., 52 (40 per cent.); B III., 15 (10·7 per cent.). Whereas 42·4 per cent. of the series of 500 were discharged to category A, only 26·1 per cent. of the rheumatic group became fit for that category. Contrasting 63 cases with a history of rheumatic fever with 67 giving a history of other forms of rheumatic infection (myalgia, chorea, repeated tonsillitis, &c.) 23·8 per cent. of the former returned to category A, and 61·9 per cent. were classified B II. or B III., whereas of the latter 28·3 per cent. returned to category A, and only 41·8 per cent. had to be classified B II. or B III. The disposal of 59 men presenting extrasystoles was as follows:—

Diagnosis.	A.	T.B.	B I.	B II.	B III.	Invalided.	Total
D.A.H.	22	4	1	1	1	5	34
V.D.H.							
Mitral stenosis	—	—	—	—	3	3	6
Mitral incompetence	4	1	2	1	2	1	11
Dilatation of heart	5	1	—	—	—	—	6
Hypertrophy of heart	1	—	—	—	—	—	1
Degeneration of myocardium	—	—	—	—	—	1	1
—	32	6	3	2	6	10	59

(Continued at foot of next column.)

ACCESSORY FOOD FACTORS (VITAMINES) IN THE FEEDING OF INFANTS.[1]

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IT is obviously a matter of great difficulty for a laboratory worker to open up a discussion concerned with the feeding of children. The task is not rendered easier by my consciousness of the exceptional difficulty in arguing from one species of animal to another when dealing with questions of diet and metabolism. Every worker on the subject of vitamines has this difficulty always before him. We must also recognise that much of the accessory food factor story has not been extended to children or tried beyond the laboratory walls. It is just for these reasons, however, that a discussion in which the laboratory worker and the clinician meet face to face is of great value. The physiologist may throw new light on the points under discussion, and, still more important, the clinician may assist the investigator in evaluating his experimental results and so prevent the exaggeration of one fact at the expense of another.

We have to consider the part played in the nutrition of infants by the three known accessory food factors: (1) antiscorbutic; (2) fat-soluble A; (3) water-soluble B or antineuritic. From the point of view of the children of this country we can probably eliminate the water-soluble B factor. Although infantile beri-beri exists in rice-eating countries, and probably in other places where one-sided and limited diets are in use, the extensive distribution of this factor in food, together with its well-recognised resistance to heat, would appear to make disease due to its deficiency unlikely to occur in Western countries.

Problems Concerning the Antiscorbutic Factor.

Of the antiscorbutic factor I shall say but little. I suggest, however, that there are certain points in connexion with this factor which urgently require consideration. It would be interesting if we could have authoritative statements on the following points: (1) Is the scurvy problem among children of this country one involving real danger? We know that the classical scurvy symptoms are rare, but it is not equally certain that milder symptoms indicating a deficiency short of the production of scurvy are not common. (2) Is it essential that children feeding on dry milk compounds alone should take orange or swede juice?

The second problem involves an answer to two questions: (1) How much of the antiscorbutic factor is destroyed in the drying of milk? (2) How susceptible is the child as compared with the experimental animals? Speaking without any particular knowledge on this point, I should think it probable that, although an infant feeding entirely on whole dried milk may not require extra antiscorbutic, yet when cereals are added to the diet additional antiscorbutic factor will be essential.

[1] Opening Remarks at the Discussion at the Section for the Study of Disease in Children of the Royal Society of Medicine on Feb. 27th, 1920 (v. THE LANCET, March 13th, p. 604).

(Continued from previous column.)

For their assistance in the diagnosis, treatment, training, and classification of the patients we desire to express our thanks to R. W. Aitken, J. B. Binns, R. Bruce, W. K. Calwell, H. E. Charles, E. E. Chipp, M. A. Collins, S. J. Fielding, J. K. Lund, S. C. W. Morris, F. J. Pierce, and J. L. Torley.

The Relation between the Fat-soluble A Factor and the Antirachitic Factor.

I propose to deal with what is possibly the fat-soluble A accessory factor. You may remember that the identification of the fat-soluble factor depended on work by Macollum in which the growth of rats was studied. The antirachitic factor, on the other hand, has been so called because of the effect of certain substances in preventing the development of rickets in dogs. Whether they are identical is unsettled, but one point of difference is so striking that it is essential to bear it in mind. The fat-soluble factor is, according to the rat-feeding experiment, absent from all vegetable fats. In the rickets experiments, however, it seems definite that the amount of antirachitic factor is fairly high in some vegetable fats, such, for instance, as peanut, cotton-seed, and coconut oils, and is only present to a small extent in palm-kernel, linseed, and babassu oils.

A second point worthy of emphasis is that fat-soluble A does not appear to be as necessary for growth in the case of puppies as it is in rats. It is true that all the diets of the pupples must have contained a trace of fat-soluble A, but the growth was often just as good when the diet was very deficient in this factor as when containing it in abundance. This fact, previously described by me, has been extended to children recently by Hess and Unger. On a diet of dried separated milk, sugar, cotton-seed oil, autolysed yeast, orange juice, and cereal, sustained over many months, they found the growth of children practically normal. The question arises as to whether, in speaking of the fat-soluble factor in relation to child nutrition, we should still continue to call it a "growth factor." For the growth of puppies and children its influence is probably smaller than that of the other elements of the diet.

It seems most likely that both these differences—that is, (1) the difference in distribution of the fat-soluble factor and the antirachitic accessory factor in vegetable fats; (2) the importance of the fat-soluble factor for the growth of rats and its probable unimportance in the growth per se of puppies and children—can be explained by variations in the general and intermediate metabolism of these animals. These points will, no doubt, be ultimately solved by further experimental work.

In the meantime I would beg those who are extending the results of experimental research on rickets to children not to mix up the two types of work—namely, the growth experiments on rats and the rickets experiments on puppies. In giving cotton-seed oil to children, as recently carried out by Hess and Unger, they had in their minds undoubtedly the generally accepted fact that this oil contained no fat-soluble A. On the other hand, so far as my experiments have shown, cotton-seed oil is to be classed as one of the better vegetable oils in preventing rickets, and, taken in conjunction with the other conditions of diet as described by Hess and Unger, it does not appear to me surprising that rachitic symptoms did not develop. I shall touch again on their experiments later.

From my earlier work, a short account of which has been already published, I consider that it is undoubted that something of the nature of a vitamine, distributed in varying quantities in fats, plays an important part in the development of rickets. I do not wish now to deal further with this particular point. In view, however, of the erroneous and exaggerated views that are widespread as to the action of the antirachitic accessory factor in diet, it is essential that an effort should be made to bring such substances away from their atmosphere of mysticism, and place them side by side with other elements of the diet. If we can in some way link up their action with the known dietetic substances, so that we can discuss them in terms that are familiar, good progress will have been made along these lines. I propose, therefore, in the remaining time at my disposal, to describe some of the more recent results of my experimental work carried out with this end in view.

The Relation of the Antirachitic Factor to Age.

It is a well-recognised clinical fact that active rickets is a rare disease in children over 2 years of age. On the other hand, arguing on the basis of my experimental results obtained with puppies, it is equally certain that, after this age, the diet of a child is often of a more rickets-producing nature—that is to say, it is frequently composed more of bread and other cereals and less of milk. The only deduction that is possible from these facts is that after a time a child becomes more independent, from the rickets point of view, of its diet. I wish to emphasise that it is only the rickets point of view I am discussing. No further deduction from this result must be made as regards resistance to infection or any other pathological condition produced by diet, and more particularly the antirachitic factor of diet at various ages. The fact that the antirachitic accessory factor is of less importance in the older child is also brought out strikingly in puppies. It is obvious for the following well-defined reasons. (1) After the puppy has arrived at a certain age I have been unable to produce rickets by feeding it on rickets-producing diets. (2) On definite diets puppies develop rickets, but if not too severe, and the general condition does not become too bad, recovery at the growing ends of the bones, as indicated by radiographic examination, often takes place, although the animal may remain on the same diet and under the same conditions.

To take the first of these facts, a puppy put on to a rickets-producing diet of separated milk, white bread, meat, orange juice, and linseed oil at the age of 5

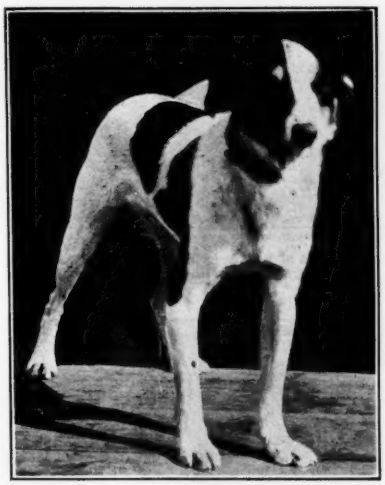

FIG. 1.—Photograph of a puppy, 10½ months old, which has been on a rickets-producing diet for the last five months without developing rickets.

months was photographed (Fig. 1) and radiographed (Fig. 3) at the age of 10½ months and was found to be free from rickets. Fig. 2 is a radiogram taken at the age of 5 months, before beginning special diet. The dieting has now been continued over 11 months in all, and the dog is still well and healthy and shows no signs of rickets. The earlier treatment of this particular dog I shall refer to later, when I deal with the effect of exercise and confinement on the development of rickets.

As regards the second of the above facts, photographs show an instance of self-cure in a puppy when the diet and other conditions were kept as far as possible the same as when the rickets developed. Figs. 4, 5, and 6 represent the changes taking place in the wrist of a puppy. The diet in this case consisted of separated milk, bread, orange juice, yeast, meat, and linseed oil, and you will see that on March 28th, after 3½ months of this diet, rickets had developed. It will be seen, however, from Fig. 5 that, one month after the first radiograph, the healing process had started and renewed calcification is evident between the epiphyses and diaphyses of the distal ends of the radius and ulna. In Fig. 6 the healing process had continued to a

further stage. Here, then, we have evidence of a self-curative process taking place in a puppy as it grows older quite comparable to the self-cure which is well recognised as taking place in children.

The above facts can be taken as evidence that the antirachitic accessory factor is more necessary in the diet the younger the animal—that is to say, until some essential process or secretion has developed in the young animal. Until this process has evolved (of its

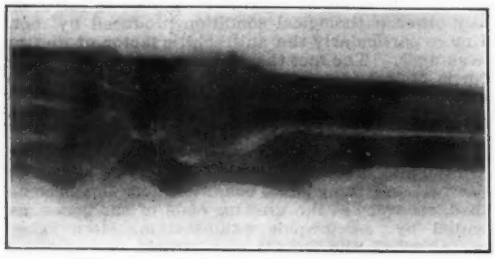

FIG. 2.—Radiogram of puppy in Fig. 1 at the beginning of experimental feeding, showing healthy wrist-joint.

FIG. 3.—Radiogram of puppy in Fig. 1, taken at same time as the photograph, showing healthy wrist-joint.

FIG. 4.—Rickets in wrist-joint of a puppy after 3½ months of rickets-producing diet in spite of complete freedom.

nature I have no idea at the present time) rickets will more readily develop. After the necessary establishment of the new process in the young animal or child, it is a matter of some difficulty to produce rickets. Whether all new calcification processes proceed normally after this event, even in the presence of deficient diets, still remains unknown, but further experiments will soon clear up this point. I should expect that a deficient diet will continue to act in a detrimental way to calcification processes, but possibly not to such a profound extent as in the younger animal and child. It is probable that the legs will continue to bend owing to poor calcification of the periosteal bone of the shafts even after there is good evidence of a healing process going on at the epiphyseal ends. The recovery and calcification of the periosteal bone of the shaft appears to be a much slower process than that at the growing ends.

The Relation of the Antirachitic Accessory Factor to the Energy-bearing Portions of Diet.

In a paper already published I laid stress on the fact that, although rickets is primarily a deficiency disease of a dietetic nature, other metabolic conditions must obviously be involved, because it is impossible to regard the accessory food factors as independent of the general metabolism and of the other elements of the diet. I emphasised the unity of a perfect diet because we are becoming more and more aware that the removal or deficiency of one element in the diet involves much more than the absence of function or defective function carried out by this one element. It also means that the other parts of the diet cannot do

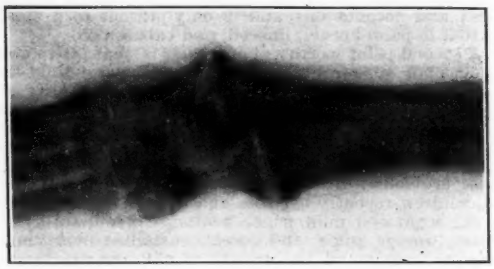

FIG. 5.—Wrist-joint of same puppy as Fig. 4 one month later, undergoing self cure. Puppy on same diet.

their task efficiently because of the constant interplay between the chemical changes in the body and their dependence on each other. During the past 18 months I have been endeavouring to prove that the same dependence and inter-relationship holds between the vitamines and the proteins, fats and carbohydrates

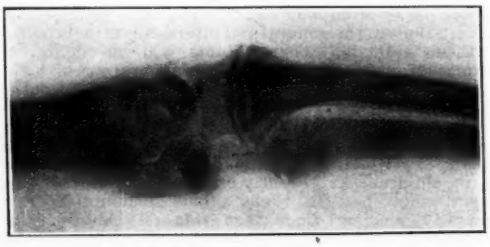

FIG. 6.—Same puppy as Fig. 5 one month later, showing healing process still further advanced.

and, although this part of the work is still in progress, sufficient evidence has been obtained to allow the conclusion that their interaction in metabolism is of great importance so far as the development of rickets is concerned. I have explained in my earlier work how the tendency to rickets is increased by more rapid growth, using the weight of the animal as the indication of growth. I am fully aware that increase in weight is not a true indication of rate of growth, because it obviously includes other factors, such as the laying on of fat. For the present, however, I shall confine myself to the relation of the development of rickets to the increase of weight. In many of the experiments the only variable part of the diet was bread, given generally to the animals *ad lib.* Therefore it is evident that, other things being equal, the greater the amount of bread eaten the greater will be the tendency to rickets. This generality is probably true, so long as the increased bread intake results in an increased *storage* of foodstuff, retained by the animal as body tissue. The same condition probably holds with oatmeal and other cereals.

In order to illustrate this point I shall show you an experiment carried out on three puppies of the same litter. The diet in each case consisted of separated milk, white bread, orange juice, meat, and palm-kernel

oil. In Fig. 7 you see the relative rates of growth of these animals. In the course of growth 221, the least rapidly growing, gained 1700 g., 223 gained 2150 g., and 220, the most rapidly growing, gained 2850 g. during the same period of 66 days. Throughout the experiment, except that the meat was raised from 5 to 10 g. per diem a few days earlier in 220 than 223 and 221, the only variable was the amount of bread eaten. All other conditions, such as housing, were identical. If, therefore, any great difference regarding the development of rickets occurred it can probably be ascribed to the variable bread intake. The radiographs of these three puppies after about nine weeks of the diet can be seen in Figs. 8, 9, and 10. It will be noticed that 221, the least rapidly growing, has very slight rickets, 220, the most rapidly growing, very severe rachitic changes, and intermediate between these two is 223, whose rate of growth is also midway between 221 and 220. Figs. 11, 12, and 13 are photographs of these three puppies, 221, 223, and

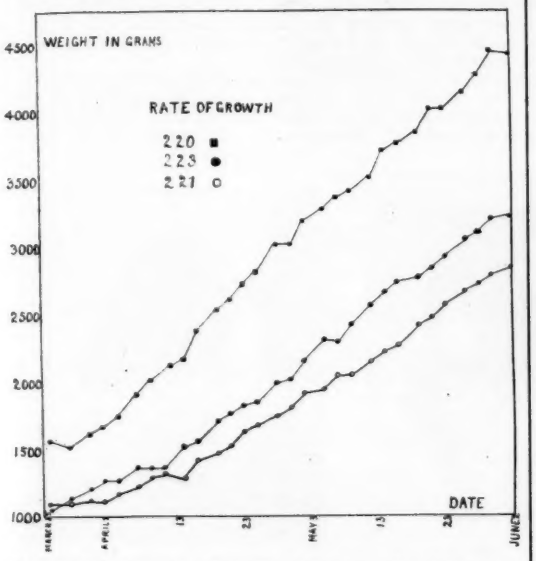

FIG. 7.—Relative rates of growth of three puppies of the same litter on diets differing only in quantity of bread eaten.

220. It will be seen that the bending and external appearances of their legs are in keeping with the radiographs of Figs. 8, 9, and 10. Let me again repeat that I am only using the word growth in the sense of putting on weight. It appears then that puppies, living under similar conditions, show a greater tendency to develop rickets when the diet contains a larger amount of cereal, all other elements of the diet being kept constant. The question arises as to what special element of the bread is responsible for this greater tendency to rickets. This point awaits complete solution, but evidence is accumulating which indicates that the carbohydrate moiety is the offending substance. There is some evidence, on the other hand, that protein has an antagonistic action to the development of rickets. In my earlier paper I referred to the effect of meat in making a slightly rickets-producing diet into a safe one. There is also an indication that casein has the same effect. F. G. Hopkins has shown that ordinary commercial casein, as used in these experiments, may have a large amount of fat-soluble A accessory factor associated with it. Whether, therefore, the protein effect depends on its own action remains to be decided. If the antirachitic effect of protein is established we will be able to comprehend one reason why milk is a better preventive of rickets than the corresponding amount of butter. I wish to make it clear that increasing the protein alone in the absence of the antirachitic accessory factor does not make a diet safe. My view is that it aids the antirachitic vitamine, so that less of the latter will suffice to keep the growth normal. Carbohydrate, on the contrary, especially when it results in storage of fat, appears to have a decidedly rickets-producing effect, and thereby makes additional antirachitic vitamine imperative.

It is possible that Hess and Unger's recent feeding experiments on children referred to above, where they

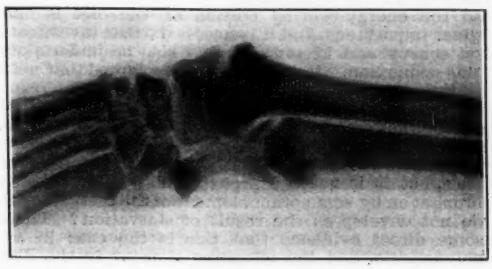

FIG. 8 (221).—Very slight rickets only in wrist-joint of slow-growing puppy. (Cf. Fig. 11.)

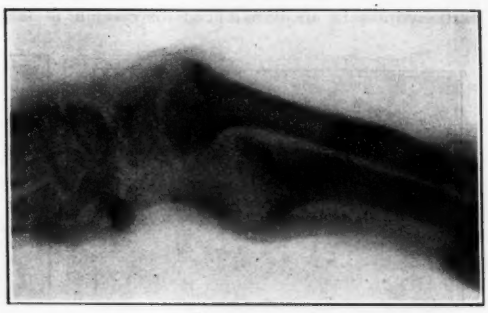

FIG. 9 (223).—Rickety changes intermediate in severity between Figs. 8 and 10, corresponding to intermediate rate of growth. (Cf. Fig. 12.)

FIG. 10 (220).—Severe rickets in wrist-joint of most rapidly growing puppy. (Cf. Fig. 13.)

found that 180 g. of a dried separated milk powder, 30 c.cm. of cotton-seed oil, 30 g. of sucrose, 15 c.cm. of orange juice, and 30 c.cm. of autolysed yeast, and, later, additional cereal per diem, did not produce rickets, may have as one part of the explanation the high protein intake of these children. I have already explained that cotton-seed oil is one of the better vegetable oils as regards its antirachitic action in puppies. 180 g. of a dried separated milk powder must have contained about 65 g. of protein, an amount which is abnormally high for children from 5 to 9 months old. This high protein intake, together with the antirachitic factor of the cotton-seed oil, appear to me to explain satisfactorily the fact that rickets did not develop in these children. As regards their observation that the children grew fairly well, in spite of the great

deficiency of the fat-soluble accessory factor, this is additional evidence that it is not impossible to argue from my experimental results on puppies to children, as I have previously commented on the good growth that can be obtained in puppies under the same condition.

I should further like to point out that the whole subject of the relationship of accessory food factors to the energy-bearing portion of the diet is one of great importance, and it is necessary that investigations on scurvy and beri-beri should also be undertaken in this connexion. It will be generally agreed that neither scurvy, beri-beri, nor rickets will develop as the result of starvation only. Therefore we must consider whether there is not a positive side also to these dietetic diseases. We know in the case of scurvy and beri-beri that administration of the suitable vitamine will effect a cure, but is it not also probable that the diseases are brought on by some other element of the diet, since they do not develop as the result of starvation? There is some direct evidence that this is the case in avian polyneuritis, and the offending element in the diet is probably carbohydrate. Results tending to prove this have been obtained by Abderhalden, Braddon and Cooper, and Funk. So, also, in the case of rickets, it may be ultimately established that it is excess of carbohydrate in an unbalanced diet which is largely responsible for the development of the disease, and that it is the special function of the antirachitic accessory factor to prevent the abnormality. The fact that the laboratory results obtained on deficiency disease have not been entirely confirmed in practice may be the result of the omission to link up accessory food factors with carbohydrates and the other energy-bearing substances in the diet.

FIG. 11 (221).—Slight rickets. Wrist-joint shown in Fig. 8.

FIG. 12 (223).—Rickets intermediate in severity between Figs. 11 and 13. Joint shown in Fig. 9.

FIG. 13. (220.)—Severe rickets. Joint shown in Fig. 10.

The Effect of Exercise on the Development of Rickets.

I have previously pointed out that, although I considered Finlay's results showing the effect of exercise on rickets to be important, I do not think exercise the prime factor in the ætiology of rickets, but only subsidiary to diet. It is, however, obvious that the ultimate explanation of rickets must embrace this also. Whatever inhibitory effect the constant running about has in the case of puppies, we must, when considering the disease in children, discount a large part of this effect. The reason for this is that rickets develops in many children when only 6 months to 1 year old, and it is difficult to see how running about can play a large part at this age. The exercise obtained by children at this period of their life consists of small movements which make up their general liveliness, and I think it will be agreed that the activity of a child depends, more than anything else, on the adequacy of its diet. Surely the size and number of rooms in the house where the child may carry on its movements are of subsidiary importance to its diet. If exercise and muscular contraction are the explanation of the ætiology of rickets, then there is clearly a simple method of eliminating the disease from Vienna, and the apostles of this gospel ought now to be preaching the glad tidings and observing its effect there. It appears to me absurd to think that the widespread and intense nature of rickets in Vienna and elsewhere in recent times has arisen primarily because of any lack of exercise or because of the more defective hygienic conditions that may have developed within the last few years.

My experiments on exercise have been made along various lines and the results obtained may be briefly stated: (1) Confinement on an adequate diet will not produce rickets. (2) Freedom in the daytime will not prevent rickets when the diet is inadequate. (3) Confinement will not prevent the cure of rickets, when the diet is good. On the other hand, complete freedom and the possibility of constant running about, will oppose to some extent the rickets-producing effect of a deficient diet and may carry it over to the safe side in small, slowly-growing dogs.

Fig. 1 is a photograph of a dog previously referred to, which was confined from the second to the fifth month of its life. During this period its diet consisted of 250 c.cm. whole milk, 20 g. meat, 5–10 c.cm. cod-liver oil, 5 c.cm. orange-juice, and white bread. In spite of the absence of the opportunity for exercise, it was a beautiful dog, showing no signs of rickets, as can be seen from the radiograph (Fig. 2) taken after the period of confinement.

The brother of this puppy was allowed complete freedom during the daytime (with a special type of muzzle on) and developed slight rickets, which can be seen in Fig. 4. It was eating a rickets-producing diet during this period, consisting of 175–250 c.cm. separated milk, white bread ad lib., 5–10 g. meat, 10 c.cm. linseed oil, and 5 c.cm. orange-juice. This animal was an instance of self-cure and, while living under the same conditions, calcification of the growing ends of the bones was resumed. This point is seen in the radiographs (Figs. 5 and 6), and has been previously commented on. The rate of growth of this puppy was not very good—it increased 2730 g. in 19 weeks while eating the diet.

Here, then, we have instances of two puppies (terriers) and members of the same family, the one remaining normal in spite of lack of exercise and the other developing rickets with full opportunity for exercise. The dominant factor in each case was the diet. The first dog had an abundance of antirachitic factor in its diet, which included whole milk and cod-liver oil. The second on separated milk and linseed oil was getting little or no antirachitic factor. I wish to repeat, however, that muscular contraction has some inhibitory action on the development of rickets and must be considered in the general scheme.

The points I have discussed, more particularly the relation of the antirachitic accessory factor to the energy-bearing portions of the diet and to exercise, indicate plainly that rickets must be considered as a problem of general metabolism. As a working hypothesis it seems possible to formulate a general scheme in which each of the various elements already discussed can find a place. Any condition which induces a laying on of tissue seems to necessitate a greater intake of antirachitic accessory factor to prevent rickets. On the other hand, conditions which stimulate the metabolism and increase the heat loss relatively to the energy of the stored food work together with the antirachitic accessory factor, and make a less amount necessary for normal growth. For instance, excessive carbohydrates in the diet often brings about a condition of laying on of fat associated with lethargy. Confinement works in the same direction. The diet under these conditions must have more antirachitic accessory factor, otherwise rickets develops. Proteins and exercise, on the other hand, are stimulants to the metabolism, and, when the diet has a relatively high protein content, and the animal is active, less antirachitic accessory factor is necessary.

It is upon this hypothesis that my present investigations on rickets are being continued, and while it is freely admitted that it is not based on complete experimental evidence, a general conception is always useful to an investigator, and can do no harm so long as it is regarded by others in its true light. The generalisation may not explain all conditions under which rickets develops, but we are in the satisfactory position of knowing that its proof or disproof can be easily tested by further experiment.

The Importance of the Antirachitic Accessory Factor in the Feeding of Children.

Up to the present I have dealt entirely with the effect of the antirachitic vitamine in the case of puppies, and it may be of interest to attempt to supply some evidence in support of the animal results, which show that, in the case of children also, this substance is of great importance. I shall deal with two investigations[2] carried out at a time when the presence of the antirachitic accessory factor in food was undreamt of.

In examining school children at Leeds Dr. William Hall was much interested in the great difference in general nutrition, and more especially in the teeth of Jewish and Gentile children, the financial position and housing of whose families were comparable. The results of his investigations were described at a health congress in Leeds in 1902, and his general observations and conclusions are so concordant with my experimental results that I should like to record them. The table here given represents a few of these results.

		Rickets.	Bad or backward teeth.
Good district	Gentile school ...	8%	38%
,, ,,	Jewish ,, ...	5%	11%
Poor ,,	Gentile ,, ...	50%	60%
,, ,,	Jewish ,, ...	7%	25%
Country school (Ripon Cathedral School)		11%	33%

The great difference between these two classes of people, more especially in the poor schools, is very striking. It will be further observed that the condition of the poorest Jewish children is better than that of the country children.

Hall then proceeded to investigate the cause of the above-described differences, and finally decided that only the dieting could be held responsible. From his analysis of the diets, which he found very different in the two classes of the community examined, I take the following points: 1. The Jewish families used large quantities of oil in cooking, even in making bread. Fish were generally fried in oil. Potatoes were not boiled in water. If boiled it was usually in milk. Otherwise they were cooked in oil. In making broth, butter and oil were added to it. 2. The normal beverage was cocoa made with milk. This was usually drunk three times a day except on the days when meat was eaten. 3. An analysis of the eggs eaten by the Jewish families showed the large numbers consumed. 4. Fruit and vegetables were used abundantly. 5. The Jewish mothers combined to buy large quantities of the cheaper fish in the market. Herrings were commonly eaten.

Dr. Hall's conclusions as to the inferior physique of the Gentile families were (1) that it did not depend on heredity or on city life; (2) that it was purely dietetic. My researches on animals are in complete agreement with the outcome of these investigations. The diet is certainly the key to the physical defects so common among urban and city inhabitants. It is also remarkable how closely the diets of the Jewish community as observed by Hall follow the animal experimental results. Nearly all the substances mentioned by Hall contain an abundance of antirachitic accessory factor.

The next subject connected with diet and child nutrition to which I wish to refer concerns the inhabitants of the Island of Lewis in the Hebrides. The facts I shall mention are taken from the Carnegie Report of the Physical Welfare of Mothers and Children of Scotland. Many of the inhabitants of these islands live in what are called "black houses." A photograph of a typical "black house" is shown in Fig. 14. They are constructed

FIG. 14.—A typical "black house," Island of Lewis, in the Hebrides. The sanitary conditions are very bad, but rickets is almost unknown in the island. Note smoke of peat fire issuing from door.

of turf and stones with a thatched roof. There is often no chimney to the house, and since the peat fires are kept constantly burning and there is no exit for smoke except through the door, the condition of the atmosphere of the house can be well imagined. The walls are often as much as 5 feet thick. Cattle often live under the same roof, the byre adjoining the house, and it is sometimes necessary to pass through the byre to enter or leave the building. Chickens have full run of the house and go on to the beds, tables, and dressers. Altogether the hygienic conditions are dreadful. What about the children? The statements are made in the report: "The children are not taken out until they can walk"; "never taken out until they can walk, except possibly for a few minutes on a fine day in the summer time." It is quite clear, therefore, that, if bad hygiene and lack of exercise are responsible for rickets and ill-health, then the infants of Lewis ought to succumb at a great rate. What are the facts? The main fact is that the death-rate of these infants under 1 year is about the lowest in the British Isles, and has occasionally fallen to as low a figure as 40 per 1000. This death-rate compares very favourably with the infantile mortality of 100 to 300 per 1000 usually found in the towns of this country, in spite of the efforts made to improve the general hygiene. It is remarked that rickets is almost unknown in the island, and "the most striking fact in the adult population is

[2] These instances were kindly brought to my notice by Dr. H. Scurfield, medical officer of health for Sheffield.

their beautiful teeth—a testimony to the absence of rickets in infancy." Parenthetically, I regret that lack of time has prevented me from showing on the lantern some of the beautiful specimens of my wife's work on teeth—work that has shown that the formation of perfect and imperfect teeth and jaws is affected by diet in a similar way to the development of the normal and rachitic condition of bones.

If we now examine the diet of these people we find results in close agreement with expectations based on the above described experimental work on puppies. In the first place, practically all the children are breast-fed. Again, an analysis of the foods eaten shows that the staple articles of diet are fish, oatmeal, and eggs. It is true that milk is scarce, except in the summer, but against this we have breast-feeding affording the opportunity to childreh to get milk at the most important period of their lives. As regards fish, we find that the liver of fish—that is, the best source of the antirachitic accessory factor—is regarded as the favourite dish. It is described as being mixed with oatmeal and milk and cooked in cods' heads, each member of the family being provided with a cod's head. It is almost certain that the breast-feeding of the children, together with the high protein and antirachitic accessory factor content of the adult diet, are responsible for the absence of rickets, the formation of beautiful teeth, and the very low infant mortality found in these islands, and that this is the case in spite of the dreadful hygienic condition of many of the houses. For the benefit of those interested in the antiscorbutic factor I may mention that vegetables are almost unknown in these parts.

Evidence is accumulating from various sources showing the effect of the diet of the mother on the accessory food factor content of milk, so that it is likely that the milk of the Lewis women is particularly rich in the antirachitic accessory factor. I do not wish, however, to discuss this point now.

If we follow up the mortality and health history of the Lewis children after the age of 1, additional facts of importance can be observed. From 1 to 5 the death-rate among the children is high, when considered in relation to the infantile mortality under 1. The housing conditions are such that epidemics spread rapidly and fatally, and phthisis in 1914 caused a death-rate double that on the mainland. When the children begin to go to school they fall off rapidly until they attain an age when they can look after themselves. This is because they generally have to go to school before their parents are out of bed, and so often do not get a real meal until midday. When the children have arrived at the age when they can fend for themselves and satisfy their appetite by seizing food, if need be, they develop well and ultimately become the fine stock so well recognised as coming from these islands.

The Relative Importance of Diet and Housing at Different Ages.

I have dwelt on this particular point because it seems to afford an opportunity of realising to some extent the relative importance of diet and housing at the different ages. It is difficult to avoid the conclusion that diet is everything to infants under 1, and so long as this is good, bad hygienic conditions are of small significance. After the first year, however, when the child becomes more susceptible to measles, bronchopneumonia, and other infections, then clearly the housing and hygienic factors, in addition to the diet, are of great importance. If these suggestions could be definitely proved and accepted, we should have gone a long way towards the solution of the problem of race decadence. It is reasonable to accept as facts that where there is low infant mortality there is an almost complete absence of rickets and the teeth of the people are good. Also that the production of rickets depends on a *relative* insufficiency in the diet of the antirachitic accessory factor, the best sources of which are fish oils, animal fats except lard, milk, and eggs. It is also probable that anything which stimulates metabolism, such as high protein in the diet and exercise, aids the antirachitic accessory factor; while excess of carbohydrate, especially if it leads to a laying on of fat, works in an antagonistic way to the vitamine and makes it necessary to have a greater amount in the diet to ensure normal growth of bone, formation of sound teeth and jaws, and good general health.

My investigation on rickets is still in progress and the results remain incomplete. The mode of production of the disease is obviously complex, otherwise it would have long been solved; but by considering and altering each factor in turn the animal experimental method will certainly in time clear up all the points of difficulty.

ON THE RELATION OF THE LIPOCHROME PIGMENTS TO THE FAT-SOLUBLE ACCESSORY FOOD FACTOR.

BY O. ROSENHEIM AND J. C. DRUMMOND.

(From the Physiological Laboratory, King's College, London, and the Biochemical Department, Institute of Physiology, University College, London.)

SOME two years ago, when studying the growth-promoting food factor known as fat-soluble A, we were struck by the similarity of the distribution of this important dietary constituent to that of fat-soluble or lipochrome pigments. Accordingly, we carried out a number of experiments in order to ascertain whether the accessory substance is related to, or identical with, a member of the class of pigments which are found in association with fats.

The chief lipochromes* which have so far been identified and isolated as well-crystallised substances are carrotene, $C_{40}H_{56}$ (from carrots, green leaves, milk-fat and corpus luteum), and its isomer lycopin (from tomatoes), xanthophyll, $C_{40}H_{56}O_2$ (from leaves), and its isomer lutein (from egg-yolk), and, finally, fucoxanthin, $C_{40}H_{56}O_6$ (from brown algæ). All lipochromes are characterised by their extreme lability and power to take up oxygen. The hydrocarbon carrotene, for example, is able to take up 500 times its own volume of oxygen, and on this account the important function of a respiratory pigment has been ascribed to it by botanists. It is certainly significant that carrotene occurs always together with its oxide xanthophyll in the chloroplasts of green leaves, where it is associated with chlorophyll. The lipochromes are also of frequent occurrence in lower plants and bacteria. The animal organism appears to be unable to synthesise these substances and depends on plant products for their supply. It is significant from our point of view to find that their occurrence in the animal body is most obvious in those organs and secretions which are connected with reproduction and the nutrition of the growing young (ovaries, egg, milk).

The Origin and Occurrence of Lipochromes in the Human Body.

Largely as a result of the painstaking researches of Palmer and Eccles[1] in America, we possess to-day much interesting information regarding the origin and the occurrence of these pigments in the animal body. These authors have demonstrated in a most striking manner how the colour of body-fat, milk-fat, or egg-yolk is derived from the lipochrome pigments ingested

* Thudichum (1869) was the first to recognise the near relationship of the yellow animal pigments (of egg-yolk, ovaries, blood serum, and milk-fat) to those of plants (of carrots, certain fruits, and flowers). He introduced the name "lutein" as a group name, which was later on changed into "lipochrome," and quite recently into "carotinoid." Since the name "lutein" has now been reserved for the yellow pigment of egg-yolk, and as "carotinoid" does not express the intimate association of these pigments with fats, we propose to retain the term "lipochrome," which is now well established in physiological literature. In accordance with the nomenclature adopted by the Chemical Society, the term "carrotene," indicating the hydrocarbon nature of the substance, is used in preference to "carotin."

in the diet. Thus, the normal yellow colour of butter is due to carrotene and xanthophyll derived from the grass and roots consumed by the cow. Should the source of pigments be cut off, as, for example, by maintaining the animal on a diet of bleached hay and white corn, the butter-fat becomes progressively paler until it is practically white. That the fat does not lose its colour at once is attributed to a gradual utilisation of the reserves of pigments which are contained in the animal's body. Consequently, should cows be deprived of an adequate supply of the pigments in their diet, those whose body-fat is deeply pigmented with lipochromes, such, for example, as animals of the Jersey breed, will be able to provide a coloured milk for a longer period than those whose reserves of pigment are much smaller.

If we consider other examples of the mobilisation of reserve substances which occur in the animal body, it will be found that such processes are of a protective nature, and are called into play when an important function is in danger of being stopped owing to a deficiency arising in the normal supply of a necessary substance. A good example of this may be seen in the protein metabolism of the lactating female. To ensure the survival of the species it is of fundamental importance that the nutrition of the young during the period of dependence on the mother shall be adequately provided for, even if the results are for the time being detrimental to the parent. When a lactating mammal is unable to obtain a sufficient amount of protein in her diet to provide material for the normal synthesis of the milk proteins she draws upon her own tissues to make good the deficiency, and will continue to secrete a milk normal as regards its protein content as long as this endogenous source will permit. Naturally, if the deficiency in the diet of the mother continues, sooner or later even this source will fail, and the nutrition of the suckling will be impaired. The process is, however, one which protects the young against temporary fluctuations in the nutritive value of its food. A similar mechanism has been elaborated in the animal organism for ensuring the presence of lipochromes in milk and egg-yolk when the diet of the female is one deficient in this respect; a fact which strongly suggests that the lipochromes play an important rôle in the nutrition of the young. That there is a similar protective mechanism which is concerned with providing the young with a supply of the fat-soluble accessory factor when the diet of the mother is deficient in that substance is already known.[2 3]

Correlation between the Distribution of Fat-soluble A and the Lipochromes.

Apart from these interesting facts, we were impressed by the correlation of the distribution of the fat-soluble accessory substance and the lipochromes. This is illustrated by Table I., which contains a few of the chief examples. These observations led us to make a study of the functions of the lipochromes in nutrition and growth, and although our experiments are far from being complete, owing largely to an interruption of several months' duration, we desire to contribute this note in order to outline the results which we have obtained up to the present time.

TABLE I.—*Showing Distribution of Lipochromes and Fat-soluble A.*

Foodstuff.	Lipochromes*	Fat-sol. A.	Foodstuff.	Lipochromes*	Fat-sol. A.
Butter fat ...	+++	+++	Chicken fat	++	++
Egg-yolk... ...	+++	+++	Liver	++	++
Cod-liver oil...	+++	+++	Herrings (fatty fish)	+	++
Whale oil ...	++	++			
Beef fat (oleo-oil)	++	++	Cod (white fish)	–	–
Kidney fat ...	++	++	Lard	–	–
Maize kernel	+	+	Cottonseed oil	–	–
Wheat embryo	+	+			
Cabbage ...	++	++	Coconut oil...	–	–
Spinach... ...	++	++	Hardened fats	–	–
Carrots	+++	+			

* Carrotene and xanthophyll and possibly other unknown pigments.

Dietary Experiments with Carrotene.

We first directed our attention to carrots, as being a foodstuff rich in the lipochrome carrotene, and we naturally ascertained first whether this root contains the fat-soluble vitamine. Although we obtained evidence that the accessory factor is present in carrots, our experiments with rats did not indicate that this vegetable is a particularly rich source of that substance. Denton and Kohman[4] have since found appreciable amounts of fat-soluble A in carrots. The drying of carrots appeared to cause a loss of the accessory substance; at any rate, a sample of commercial dried carrots was less efficient as a source of this dietary component than the fresh roots which we tested. Green vegetables, in which xanthophyll is in excess of carrotene, were found to be considerably richer in the fat-soluble factor than carrots.

The results were sufficiently conclusive to encourage us to test the pigments themselves, and accordingly pure crystalline carrotene was prepared from carrots. The first preparation obtained by the usual process was tested on young rats which had been fed on a basal diet free from the fat-soluble factor, until they began to decline in weight. As has already been reported[5] no recovery of health or renewal of growth followed this addition to the diet. In view of the labile nature both of carrotene and the fat-soluble substance, a further preparation of the pigment was made in a pure condition, great care being taken to prevent oxidation or exposure to high temperature. This specimen was also found to be without growth-promoting action.

When we tested the crude carrotene fraction, which contained other substances, such as xanthophyll and cholesterol, we observed definite evidence that the fat-soluble substance was present, although in low concentration. We were not successful in preparing crystalline xanthophyll from the crude carrotene fraction, this not being a very suitable source. A crude xanthophyll preparation which was tested gave inconclusive results, there being a slight indication of growth-promoting powers.

These results weakened somewhat our conception of the identity of the fat-soluble factor with a lipochrome pigment; nevertheless, we turned our attention to the study of certain animal oils and fats which are known to contain both lipochromes and the growth-stimulating factor.

Dietary Experiments with Unsaponifiable Fractions of Animal Fats.

The lipochromes which accompany many fats are generally supposed to be resistant to the action of alkalis, and may be detected in the unsaponifiable fraction, but certain facts indicate that the process of saponification is not without action on the pigments. A number of oils and fats rich in the fat-soluble A were hydrolysed by alkalis, by a method which eliminated as far as possible the risk of changes resulting from oxidation or exposure to high temperatures. From the saponified oils the unsaponifiable fractions were separated, and tested for the presence of lipochromes by the usual chemical tests, and for the presence of the fat-soluble vitamine by feeding experiments with rats. In this manner the unsaponifiable matter of butter-fat, cod-liver oil, liver tissue, whale oil, and shark-liver oil was prepared and tested. These fractions all gave reactions for the lipochrome pigments, but, as has been already reported,[5] they were found to be valueless as source of the accessory substance. It must, however, be remembered that the lipochromes are highly labile compounds and easily undergo decomposition during their preparation under the influence of air and light. In this respect also they resemble the fat-soluble vitamine. (See Zilva[6] and Osborne and Mendel.[7])

Possibility of Relationship between Lipochromes and Fat-soluble A.

It seems, however, justifiable to conclude from our experiments that, at any rate, the pigments present in our extracts, as well as crystalline carrotene, are not identical with fat-soluble A. In spite of these negative

results, we still feel that the possibility of an intimate relationship existing between the lipochrome pigments and the fat-soluble accessory substance should be carefully considered. In this connexion it is well to bear in mind that the lipochromes exist in plants and animals in close combination with other substances. Thus it would seem that the lipochromes of flowers and fruits are present in some combination with cholesterol esters of fatty acids. (See Czapek, "Biochemie der Pflanzen," 1905.) One of us found some years ago that the lipochrome of ox-serum may be obtained in watery solution, combined with alkaline metaprotein and cholesterol esters, on coagulating the serum proteins without the addition of acids. From this combination the pigment is liberated by boiling alcohol. Further, Palmer and Eccles[1] describe the pigment carrotene existing and being transported in the blood in the form of a water-soluble complex with protein. This complex is a fairly stable one, but is readily broken down by the action of alcohol, after which the pigment is soluble in the usual fat solvents. Now McCollum, Simmonds, and Pitz have shown that fat-soluble A occurs in the embryo of certain seeds in a form which is insoluble in fat solvents, and they suggest that this form is probably a complex of the accessory factor with another cell-constituent, such as protein.[8] Whatever the nature of the complex may be, it is one which is broken down by treatment with alcohol, the fat-soluble substance being liberated in a form soluble in fat solvents.

Palmer and Kempster[9 10] have recently investigated whether or not the lipochromes are of importance to the fowl for growth, fecundity, or reproduction. From a number of observations on chickens, fed on diets supposedly free from lipochromes, they conclude that it is possible to raise fowls to maturity on rations containing the merest traces of, if not entirely free from, these pigments, and that the full-grown hens in such cases show normal fecundity. No abnormality of the lipochrome free eggs was noted.

Experimental Evidence Reviewed.

A closer examination of their experiments, however, reveals the fact that when the birds were fed solely on a diet of white corn, bleached flour, and separator milk, a diet which the authors considered practically free from lipochromes, and which would also be very deficient in fat-soluble A, they were unable to develop normally, and it was found necessary to add a ration of pig's liver before satisfactory growth was observed. Apparently the authors regard this supplement as being free from lipochrome pigments. Certain of our experiments have shown us, however, that substances resembling the lipochromes do occur in pig's liver, as well as in the livers of all species as yet examined. Consequently it is quite possible that the supplement of liver was actually providing the lacking pigment substance conceivably required for normal development. In fact, it is not unreasonable to interpret certain results which these American workers have obtained as evidence in support of the idea that substances closely related to the lipochromes are of importance in nutrition. For instance, their experiments show that when a fowl is given a diet deficient in these pigment substances, she gradually loses the deposits which are present in many of her own tissues, particularly if she is laying at the time. When these reserves are nearly exhausted, as is indicated by the pallor of the shanks and beak, and a diet rich in xanthophyll is administered, the ingested pigment is all deflected to the ovaries and used for inclusion in the yolks of the eggs which are being formed, none being incorporated in the adipose or other fatty tissue as long as fecundity lasts. In fact, the authors state their belief that the fading of the normal colour of the ear lobes, beak, and shanks which occurs during fecundity is due to a deflection of the normal path of excretion of xanthophyll from those parts to the egg-yolk. It appears reasonable to argue that such deflection would not occur unless the substances were required for a definite and important function in the egg. That the eggs laid by the fowls on the supposedly lipochrome-free diet were found to be fertile is not a strong argument in support of the dispensability of the pigments, for it is recorded that the yolks of these eggs retained a certain amount of residual colour, although Palmer and Kempster do not believe this was due to carrotene or xanthophyll. Only those who have had extensive experience with feeding experiments can fully appreciate how very small are the traces of certain dietary constituents which are sufficient to provide what the animal body requires for its growth.

Particularly in the light of the recent work by Steenbock and Boutwell[11] does it appear unlikely that the association of yellow pigments with growth-promoting properties ascribed to fat-soluble A is mere coincidence.

These authors have also commented on the existence of this association in a number of types of maize, and their interesting results are given in Table II.:—

TABLE II.

—	Value as source of fat-soluble A.	Pigments.
Yellow maize	+	+
White maize...	−	−
Red maize (yellow endosperm) ...	+	+
,, ,, (white ,,) ...	−	−
Potato	−	−
Yellow sweet potato	+	+

Further Experiments.

Since our own work has led us to the view that the fat-soluble A is probably not identical with either carrotene or xanthophyll as such, but that it is in some manner associated with this type of pigment, we have extended our investigations to the pigments of liver-fats. These results will be published in full at a later date, but it may be stated that we have found in liver tissue, besides carrotene and xanthophyll, a substance which gives certain reactions similar to those given by the lipochromes, and which is not identical with any known member of that class. This substance appears to be responsible for the well-known colour-test with sulphuric acid, which is extensively employed by analysts as a test for cod-liver oil. The opinion regarding this test seems to have been that it was due to an impurity derived from changes of a putrefactive nature in the livers during the preparation of the oil, and that it would not be given by a good sample prepared from the fresh organ. We believe we have sufficient evidence to say that this view is incorrect, and that the substance is a normal constituent, not only of fresh cod liver, but of all liver fats. It remains in the unsaponifiable residue of liver oils, is very prone to oxidative changes, and appears to be derived from the food. Attempts are being made to isolate the substance and to identify its character, it being of particular interest to us to ascertain whether it is another lipochrome.

Conclusion.

In summarising our results, so far obtained, it may be said that, whilst the identity of the fat-soluble accessory food factor with a known lipochrome pigment appears to be improbable, there are reasons for assuming that it is in some manner associated with that class of substances.

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BRISTOL HOSPITAL SUNDAY FUND.—**Up to the present £5039 have been received as the result of the Hospital Sunday collections in Bristol, and it is practically certain that the total for 1920 will be a record amount.**

TREATMENT OF BILHARZIA DISEASE WITH TARTAR EMETIC IN SOUTH AFRICA.

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THE treatment of bilharziasis in South Africa of 30 cases varying from 9 to 39 years of age, with symptoms lasting from one week to 25 years, helps to confirm the value of intravenous injections of a solution of antimonium tartrate. As far as the destruction of the parasites themselves are concerned this drug would appear to be equally effective in recent and in long-standing cases; whilst the effect of the drug on the parasites in the blood-stream would appear to be in no way related to the age of the patient.

The experience I have gained from carefully watching a series of cases during the last 12 months leads me to say that:—1. The scalding and vesical pain that these patients complain of may be expected to disappear after the second or third intravenous injection. 2. The patient will probably remark on the disappearance of the blood from the urine within a week or ten days, though hæmaturia may be prolonged where there is a tendency to papillomatous growths. 3. Degenerating miracidia may be seen within the shells of the eggs shortly after the dose administered has reached a full grain. 4. That blackened eggs may appear after a total of only 1 1/4 gr. has been given. 5. Free swimming, dying miracidia are not uncommon in undiluted urine at the end of two weeks' treatment. 6. A cloudy condition of the urine due to phosphates is common during the second or third week, and readily responds to cystopurin. 7. The disease is usually cured when the urine has been free from living eggs for a fortnight or three weeks. 8. The presence of many dead eggs and blood cells indicates that further treatment is required. 9. The absence of living eggs for a month indicates that the female parasites are all dead. If the parasites are going to cause mischief again they are unlikely to take more than a fortnight to three weeks to recover after the administration of the drug has ceased.

Certain Cases Described.

Case 1 is an example of the occurrence of pain after a concentrated solution. G. R. R. contracted bilharzia disease at Clairwood six years ago. On Oct. 8th the urine was blood-stained and contained terminal-spined ova. He was given tartar emetic ¼ gr. intravenously. On the 10th he received ½ gr., on the 14th ¾ gr., and on the 21st 1 gr. After this last injection he complained of some pain in the shoulders lasting two days. Examination of the centrifugalised deposit from the urine on Nov. 21st showed fewer ova, half of which were black or shrivelled and the urine itself was clearer. On the 27th he reported that no blood had been seen since the 23rd. He received 1 gr. tartar emetic in 2 c.cm. of distilled water. On the 30th he again complained of pain in the shoulders, lasting two days, after a second injection of 1 gr. in 2 c.cm. of water. On Nov. 5th he received 1¼ gr. tartar emetic in 5 c.cm. of distilled water without any after-pains. No ova could be detected on five separate occasions after this, but one degenerated miracidium was seen just moving in the undiluted urine on the 13th. On Dec. 4th he was discharged as cured, having received 10¾ gr. of tartar emetic solution, the urine being free for over a month from all ova, except the miracidium mentioned above. In this case the solution was used on several occasions twice as strong as what I usually inject.

On Feb. 4th the patient returned complaining of acute cystitis. The urine was cloudy and contained mucous membrane cells but no ova. However ½ gr. tartar emetic was given intravenously and ¾ gr. on the following day. This latter dose was followed by a slight rigor an hour later. On the 7th 1 gr. tartar emetic was given, but the urine was still free from ova, suggesting that the parasites had all been killed in November, and the cystitis was not due to any recurrence of bilharzia infection.

Case 2 records vomiting in a child after injection. C. R. contracted bilharzia disease through bathing in the Umhlatazana at Clairwood two years ago. He is now aged 13. On Nov. 5th the urine was blood-stained and contained numerous terminal-spined ova. On the 7th he received ¼ gr. tartar emetic intravenously. On the 10th he received ⅜ gr. and on the 12th ½ gr. without ill-effects. After receiving 3⅜ gr. in all by the 22nd, the centrifugalised urine showed debris and three dead eggs. On three occasions this patient vomited after an intravenous injection of a full grain, which was given shortly after a light meal. On Dec. 13th he was discharged as cured, having received 9½ gr. of tartar emetic intravenously. Repeated microscopic examination of the centrifugalised urine showing only dead ova since Nov. 22nd and the urine remaining clear.

Case 3 records a rigor in a child following injection. H. R., aged 9, contracted bilharzia disease through bathing in the Umhlatazana at Clairwood two years ago. I have obtained numerous *Physopsis africana* from this river. On Oct. 9th the urine was very cloudy and contained numerous ova and blood cells. From Nov. 5th to 14th he had four intravenous injections of tartar emetic, commencing with ⅛ gr. On the 15th the urine was clearer; this might be due to cystopurin which he was taking, but the ova were blackened from the action of antimony. On the 17th he received ½ c.cm. of collosol antimonium (Crookes). The temperature rose to 99·8°F. the following day, though the patient was put to bed immediately after each injection. On the 20th he received 1 c.cm. also intramuscularly and on the 25th ¾ c.cm. with similar rises in temperature. On the 27th and 29th he received ¾ gr. tartar emetic intravenously. On Dec. 2nd a full grain of the drug was followed by a rigor half an hour after the intravenous injection. The following day the urine was very clear and contained only a few dead ova. On the 4th, 6th, 8th, and 10th he received intravenous injections, a full grain on the 8th without bad effect. On the 13th he was discharged as cured, as five microscopic examinations of the centrifugalised urine revealed nothing but dead ova. He received 6⅝ gr. of tartar emetic intravenously and 2¼ c.cm. of collosol antimonium.

Case 4 is one in which a measly rash followed injection. M. M. contracted bilharzia disease 12 years ago from the river at Amersfoort, which is a tributary of the Vaal. He had noticed blood in the urine practically every day since then, and occasionally suffered from such acute attacks of renal colic that hypodermic injections of morphia were necessary. Micturition was always attended by a scalding sensation. Nov. 11th: Cloudy urine contains numerous terminal-spined ova and numerous cells. 12th: Tartar emetic, ¼ gr. intravenously. 14th: Tartar emetic, ½ gr.; slight vomit. 16th: Tartar emetic, ¾ gr.; all right; slight blister from the 12th; urine contains ova and cells. 18th: Tartic emetic, 1 gr.; slight vomit; measly rash all over; blisters along veins of arm injected. Sod. sal., 8 gr., sod. bicarb., 8 gr., tr. nuc. vom., ♏ viii., t.d.s.; corrosive sublimate lotion; codeia, ½ gr. at night. 21st: Tartar emetic, 1¼ gr.; vomit and cough; skin almost normal. 23rd: Tartar emetic, 1½ gr., one hour after codeia, ½ gr; slight vomit and cough; skin normal. 24th: Skin normal. 25th: Tartar emetic, 1¼ gr., three-quarters of an hour after codeia, ½ gr.; urine clearer, does not scald. 27th: Tartar emetic, 1¼ gr., half hour after codeia, ½ gr.; no cough or vomit; urine contains ova. Dec. 1st: Tartar emetic, ⅝ gr.; urine clearer than it has been for 12 years. 2nd: Urine contains a few dead ova and dead masses of cells. 3rd: Tartar emetic, 1 gr.; urine contains few dead ova and 1 dead miracidium. 5th: Tartar emetic, 1⅛ gr.; slight cough; urine contains very few black ova. 7th: Tartar emetic,

1½ gr.; slight vomit; urine contains 2 dead ova. 9th: Tartar emetic, 1½ gr.; bad cough. 11th: Urine contains no ova; no colic or pyrexia noted throughout. 12th: Tartar emetic, 1 gr.; no cough; 1 dead ovum, 2 dead masses of miracidia. On Feb. 20th the patient reported that there had been no recurrence of blood in the urine.

Case 5 is an example of pyrexia and chronic cough after injection. J. B. contracted bilharzia disease from bathing in the Libode river three years ago. There had been hæmaturia ever since. He is now 10 years old. On Oct. 25th the urine, which was tinged with blood, contained numerous terminal-spined ova and shreds of mucous membrane. He had never suffered pain or colic. On the 27th he was given ♏ v. collosol antimonium intramuscularly; this dose was repeated on the 29th and 31st without ill-effects, and a ½ c.cm. was given on Nov. 3rd with only a slight rise in temperature. On the 5th he commenced intravenous injections of tartar emetic, receiving ½ gr. on this date and ½ gr. on the 7th. On the 10th his temperature rose to 104° F., and was not normal until the 14th, when he received ½ gr. without ill-effect. However, for a fortnight he was troubled with cough, which seemed to be aggravated by the intravenous injections. On the 15th the urine was clear for the first time for about three years and the ova were mostly black. On 12 subsequent days the centrifugalised urine was seen to contain only dead ova, most of which were jet black. On the 20th he received 1 c.cm. collosol antimonium. His temperature rose to 100·4° the following day. On Dec. 18th he was discharged as cured, having received 8½ gr. of tartar emetic intravenously and 2·5 c.cm. of collosol antimonium. On Jan. 21st the father, who is a medical man, reported that there had been no recurrence of hæmaturia, and the microscopic examination of the centrifugalised deposit of his clear urine revealed an entire absence of ova.

In Case 6 the ova were blackened by collosol. H. B., aged 12, contracted bilharzia disease from the Libode river at Libode three years ago, and noticed blood in the urine every day since then. For the last two years he has had occasional attacks of renal colic, usually in the right side, but once in the left. These attacks were bad enough to require hypodermic injections of morphia about once in three months, otherwise he was free from pain. On Oct. 25th the urine was blood stained and contained terminal-spined ova and shreds of mucous membrane. On the 27th ♏ v. of collosol antimonium (Crookes) were injected into the right deltoid muscle. This dose was repeated on the 31st and Nov. 4th. The first dose gave rise to a temperature of 103·5° F., which rose after the second to 101·5°. The third dose was not associated with any rise in temperature. On Nov. 1st the slightly blood-stained urine contained many blackened ova.

In view of the presence of *B. coli* in the urine, cystopurin tablets were given daily, commencing with half a tablet dissolved in water t.d.s. On Nov. 6th intravenous injections of tartar emetic were commenced, ½ gr. was given on this date and ½ gr. on the 7th. There was a slight bronchial cough for the next week or ten days. On the 22nd the patient had a severe attack of renal colic, which necessitated hypodermic injections of morphia ½ gr. and later ½ gr. X ray examination showed no calculus. On the 25th the urine contained numerous phosphates, crystals, leucocytes, and one living miracidium inside a shell in the undiluted specimen. This was the last living ovum to be detected in the urine; from that time most of the ova were blackened. After 1 gr. of tartar emetic solution intravenously on Dec. 2nd the patient had some difficulty in breathing and slight cough for about half an hour. On the 13th ♏ x. of collosol antimonium were given intramuscularly; the temperature rose to 102° F. the following day. On the 18th the patient was discharged as cured, having received 8½ gr. of tartar emetic and ♏ xxv. of collosol antimonium (Crookes). On Jan. 21st the urine was again examined for ova, though there had been no recurrence of his symptoms. Three dead ova were found, one of which was blackened.

Case 7 records headache following injections. J. W., aged 16, had suffered from slight hæmaturia and occasional pains in the back for five years since bathing in the Umhlatazana at Escombe, Natal. He was pale, but there was no tenderness of the internal organs. On Nov. 24th, 1919, the urine was cloudy and the centrifugalised deposit contained shreds of mucous membrane, blood cells, and terminal-spined ova. On the 26th he was given ¼ gr. tartar emetic in 1 c.cm. of distilled water. The skin was sterilised by spirit vini rect., and all the injections were given in the same vein of the right anticubital space. There was no local reaction or general symptoms throughout the treatment except headache. The injection of ½ gr. on the 27th was followed by rather severe headache, which lasted 24 hours. This was relieved by a sod. sal. mixture. On Dec. 1st he said he thought the urine was clearer. He had had ¾ gr. on Nov. 29th, and received a full grain on Dec. 1st. On the 3rd he received 1¼ gr. without ill-effect, a grain on the 5th, and 1½ gr. on the 8th. On this occasion he felt a slight irritable feeling in the throat, but had no cough or retching. The urine contained several blackened ova and two living ones. These were the last to be seen, and the injections no longer caused headache. On the 13th he said there was no sign of any blood, and the urine was free from ova on this date and the 19th. In all he received 10¼ gr. of tartar emetic. On Jan. 6th the patient still remained free from symptoms, and the clear urine contained only two dead brown eggs.

Case 8 was complicated by "gravel." On Jan. 13th, 1920, A. S., aged 39, reported to me that he had contracted bilharzia disease at Bozana, a tributary of the Umvoti, when 14 years of age. He had noticed a distinct itching of the skin whenever he bathed there. For some years he had had attacks of gravel every four or five months, but this had been relieved since he had undergone treatment by Dr. W. A. Peverley, of Malvern. Eighteen months ago, however, he had had another bad attack of gravel and had suffered on and off since then. He was still complaining of pain in the left side, and, as the typical terminal-spined eggs were found in the urine, he was given ⅜ gr. tartar emetic intravenously at my consulting-room. The following day he received ¾ gr., and was recommended to take sodium phosphate effervescent. One blackened egg was found in the urine on Jan. 19th, after he had been given a total of 3½ gr. On the 24th 1½ gr. was given without ill-effect. The urine was cloudy with phosphates on the 23rd; but no ova, dead or alive, were detected after Jan. 21st, except on the 31st, when four blackened eggs were seen. On Feb. 2nd he was given his last injection of 1 gr. and was discharged from further treatment. He had received a total of 10½ gr. tartar emetic intravenously, and 1 c.cm. collosol manganese intramuscularly to clear up the urinary tract. On the 14th the urine was found to be still free from eggs, but he still had a tendency to gravel formation.

Case 9 showed a tendency to cough after injection. T. G. contracted bilharzia disease through bathing in the Orange River at Upington, Northern C.P., during the recent rebellion. He was treated for it whilst on further service in German West Africa; but had had continuous burning sensation whilst passing his water during the last three years, and this was always worse during the hotter season of the year. He commenced treatment with ¼ gr. of tartar emetic on Jan. 26th, when the blood-stained urine was found to contain numerous terminal-spined eggs. On the 28th, when he returned for his third injection, he stated that the burning sensation had gone. On the 30th the urine was getting clearer and contained fewer eggs. On Feb. 2nd he stated that the urine was decidedly clearer. After 1 gr. tartar emetic on the 5th he was troubled with an irritating cough lasting about three minutes after the injection; this was noticed on five subsequent occasions. Black and dead eggs were discovered in the urine on the 7th, but no eggs after that. On the 11th he stated that there was now no sign of blood and, up to the 19th, the centrifugalised urine showed entire absence of eggs. He has now received 11¼ gr. of tartar emetic, but the injections are being continued.

Remarks on Treatment.

In a warmer climate it would seem that one is justified in treating the majority of bilharzia cases

as out-patients, provided they are warned against the very serious risk of contracting a "cold" after an injection, and provided they are in easy reach should any untoward symptoms, such as throbbing in the head, vomiting, and faintness occur. My experience would seem to show further that: 1. It is unnecessary for adults to remain in bed, but that they should stay quietly indoors for the rest of the day following an intravenous injection of antimonium tartrate. Children should be kept in bed for the rest of the day. 2. A rise in temperature is most uncommon, and can usually be explained by local sepsis or exposure to cold shortly after an injection. 3. Many patients show no ill-effects whatever; whilst in others there is a risk of cough, vomiting, tightness in the chest, or syncope immediately following the injection. 4. In codeia we have a valuable means of counteracting these possible reactions to the drug; but it is seldom found to be necessary if only moderate doses have been given. 5. A dose of 1½ gr. is sufficiently large to administer to any patient, and may be repeated every second or third day. 6. ¼ gr. is a sufficiently large dose to commence with, and a tolerance, even for this amount of the drug, should sometimes be acquired by previous medication with small intramuscular doses of collosol antimonium. 7. The injections may be given daily until ¾ gr. is tolerated, and then on alternate days or every third day. 8. Where doses not exceeding 1½ gr. are given regularly for three weeks to a month a total of 12 gr. tartar emetic is generally sufficient to effect a cure of bilharzia disease. 9. A mixture of sodium salicylate and bicarbonate of soda is useful where the drug would seem to be responsible for headache, generalised pains, rise in temperature, or skin rashes. 10. Attacks of renal colic may occur at any stage of the treatment in patients who have previously suffered therefrom; but, in the majority of cases, these attacks become less frequent as the treatment continues, and in many disappear entirely when the parasites are dead. 11. Although the male worms are more common than the females, the examination of the eggs in the centrifugalised deposit of the urine passed by the patient affords a very fair indication of the effect that the antimony is having on the eradication of the parasites from the system.

Durban, Natal.

A NOTE ON THE VALUE OF BLOOD TRANSFUSION BEFORE OPERATION

IN SEVERE SECONDARY ANÆMIAS.[1]

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THE value of blood transfusion in cases of sudden and profuse hæmorrhage from the uterus has already been demonstrated by Dr. Russell Andrews and Mr. Gordon Luker. The case here recorded directs attention to its value in the more gradually produced anæmia of uterine fibromyomata.

M. M., aged 45, was admitted into St. Bartholomew's Hospital on May 11th, 1919. She had been married for 18 years, but had never been pregnant. Menstruation commenced at the age of 13, and was regular and normal in amount until November, 1918. From November, 1918, to April, 1919, there was amenorrhœa. Early in April vaginal hæmorrhage commenced and soon became profuse; she lost a considerable quantity of blood every day and passed large clots. Towards the end of April she commenced to suffer severe and constant pain over the left iliac fossa. The pain and bleeding continued until her admission into hospital on May 11th.

On admission she was very anæmic, restless, and breathless; the pulse was 130 of poor volume, the temperature 101° F., the tongue was dry and furred. There was incontinence of both urine and fæces and frequent vomiting. The urine contained a cloud of albumen but no renal elements.

The blood count was:—

Red cells ...	1,670,000 per c.mm.	Hæmoglobin ...	22·5 per cent.
White ,, ...	52,000 ,,	Colour index ...	0·7

The patient was so breathless that great care was necessary in moving her, and she fainted during examination. The breasts were inactive; a hard tumour was felt rising from the pelvis and reaching nearly to the costal margin, the greater part of the tumour was insensitive but one portion, situated above the right Poupart's ligament, was tender. The vagina contained blood-clot, the cervix was high up near the symphysis pubis, and behind it was a rounded cystic tumour.

From the 11th to the 17th the patient's condition gradually became worse, but I was afraid to remove the tumour. The temperature varied between 102° and 104°; the pulse between 120 and 140; vomiting was frequent and the incontinence of urine and fæces continued. On the 17th the red blood cells had fallen to 845,000 per c.mm., and the white cells had risen to 65,000 per c.mm. A differential count showed:—

Polymorphs...	85 per cent.	Eosinophiles ...	1½ per cent.
Lymphocytes	8½ ,,	Basophiles	1½ ,,
Large mononuclears	3½ ,,		

On this day it was decided to transfuse the patient. The clerk of the case, Mr. Clayre, generously offered to give the blood, and both donor and recipient were found to belong to Group IV. 600 c.cm. of citrated blood was transfused into the median basilic vein. The effect was almost magical. Three days later the temperature was normal, the vomiting had ceased, she had regained control over the bladder and rectum, the red cells had risen to 3,485,000, and the white cells had fallen to 29,000 per c.mm.

I operated on June 5th. The abdominal tumour proved to be the uterus enlarged by the presence of fibro-myomata showing hyaline and cystic degeneration. The tumour felt in the pelvis was a pseudomucinous cyst-adenoma of the ovary. I performed subtotal hysterectomy with removal of the ovaries and tubes. Arrangements were made for again transfusing the patient during the course of the operation, but the amount of blood lost was so small that I did not consider it necessary, The patient made an uninterrupted recovery and left the hospital quite well at the end of three weeks. On the day of her discharge the red blood cells numbered 4,250,000 and the white cells 10,400.

Remarks.

I have recorded this case because it involves an important principle, and I believe the treatment adopted will enable us to save lives which would otherwise be lost. It is my intention in future to transfuse all patients in whom the anæmia is severe before operating for fibro-myomata. I believe that by this means I shall diminish the risk of the operation, lessen the liability to thrombosis, and shorten the period of convalescence. I propose also, when the patient is very anæmic, to adopt this procedure in cases of carcinoma of the cervix before performing Wertheim's operation. I have already done this in one instance with a striking improvement in the condition of the patient.

I suggest further that blood transfusion should be performed before delivery in cases of severe ante-partum hæmorrhage, and during the last few months that I had charge of the lying-in ward at St. Bartholomew's Hospital the blood of the students working in the ward was tested to ascertain their groups as possible donors.

[1] A paper read at a meeting of the Section of Obstetrics and Gynæcology of the Royal Society of Medicine on April 8th.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF MEDICINE.

NON-NEPHRITIC ALBUMINURIA.

A MEETING of this section of the Royal Society of Medicine was held on March 23rd, Dr. A. F. VOELCKER, the President, being in the chair.

Dr. R. L. MACKENZIE WALLIS read a paper entitled "Non-Nephritic Albuminuria." The term non-nephritic albuminuria was adopted to include all those forms of proteinuria where there was no demonstrable organic disease of the kidneys. The group included physiological albuminuria, transient albuminuria, intermittent albuminuria, the various types of functional albuminuria, orthostatic, cyclic, adolescent, &c., and a new group designated "leaky" kidneys. The chief object of the paper was to bring forward a definite group of cases which presented features akin to those found in the various forms of functional albuminuria but sufficient to warrant further discussion. In view of the results obtained in such cases, the term "leaky" kidneys had been devised, and, although not by any means a satisfactory term, it nevertheless conveyed the true significance of the condition. The question arose as to the means at our disposal for differentiating these various forms of non-nephritic albuminuria from those due to true organic disease of the kidneys. The chief protein present in the urine in nephritis was albumin, although in the blood there were both serum-albumin and serum-globulin. Further, the globulin in the serum occurred in two distinct fractions—viz., euglobulin and pseudo-globulin, the former presenting all the chief characters usually ascribed to globulin. Globulin occurred in the urine in association with albumin, but in different proportions. Thus in chronic nephritis the amount of globulin was low, but it generally increased in the later stages of the disease. The chief point was that in all types of functional albuminuria the globulin was increased in amount, and it was almost invariably of the type known as euglobulin. In "leaky" kidneys the greater part of the protein in the urine was in the form of globulin similar to euglobulin, but having associated with it an excess of lipoids, fatty acids, &c. The differentiation of these various types was based upon the following urinary tests: the production of a precipitate by the addition of dilute acetic acid in the cold, dialysis test, distilled-water test of Roberts, half saturation with ammonium sulphate, the ratio of albumin to globulin, the urinary diastase content, and microscopical examination of the sediment. The following table gave the results obtained in the various conditions:—

—	Acetic acid in the cold.	Dialysis.	Half satn. ammon. sulphate.	Ratio of albumin to globulin.	Diastase in units.
Functional albuminuria	+	+	+	2 : 1	10-22·2
Leaky kidneys ...	+	+	+	1 : 2 to 6	10-33·3
Chronic nephritis—					
Mild	0	0	0	10 : 1	10
Moderately severe	0	0	0	6 : 1	5
Severe	0	0	Slight +	5 : 1	Less than 5
Toxic nephritis ...	0	0	+ or 0	6 : 1	50-500

The globulin which is precipitated by acetic acid in the cold is euglobulin, and this test almost invariably gave positive indications in all the cases of functional albuminuria examined. This euglobulin, being insoluble in water, is also precipitated by dialysis, and gives the characteristic smoke rings when the urine is dropped into a cylinder of distilled water for the same reasons (Roberts's test). The globulin met with in the urine of the leaky kidney cases behaved in the same way, but when submitted to careful analysis was found to have lipoids and fatty acids associated with it in varying amounts. Since these associated lipoids could be extracted from euglobulin as well, the differences observed were merely differences in the degree of absorbed lipoids. This was well illustrated by the speaker's work on milky pseudo-chylous ascitic fluids. The cases about to be narrated by Dr. Tyson appeared to belong to the group of leaky kidneys, the urine of one case showing all the characters described above, and the globulin isolated containing fatty acids and lipoids. In three cases of globulinuria associated with syphilis the same changes had been observed—viz., the association of the globulin in the urine with lipoids. The maximum effect of this association was to be found in the case about to be described by Dr. Batty Shaw. Here true lecithin-globulin was isolated and the amount present was sufficient to give an opalescent appearance to the urine.

The occurrence of euglobulin or lipoid globulin in the urine was of considerable significance. Not only was it an indication of non-nephritic albuminuria, but the very simplicity of the tests for its presence in urine warranted an extended investigation of all cases of albuminuria. Further, the value of the tests as an aid to prognosis was borne out by Dr. Tyson's and Dr. Batty Shaw's cases. A case described by Bramwell and Paton in 1892 would appear to belong to the same group of "leaky" kidneys and was of particular interest in that at the autopsy no macroscopical or microscopical changes could be detected in the kidneys. As to the significance of this lipoid globulin it was at present impossible to make a definite statement. The compound had been found in all pseudo-chylous effusions which he had had the opportunity of examining. Further, in severe cases of nephritis the serum, as first observed by Bright, might become milky. The milkiness was due to the same lipoid globulin, at least in all cases of this nature which had come under the speaker's own observation. Now this same protein had been isolated from the urine in a certain group of cases which for convenience had been grouped together under the term "leaky" kidneys. This protein, or rather protein-complex, was obviously foreign to the body, and it would appear that under certain conditions it escaped through the kidneys. In doing so it apparently did no material damage to the renal epithelium, as patients continued to pass large quantities of it for years without showing any obvious signs of organic disease. The difference between this condition and functional albuminuria was one of degree, the same type of protein being present in the urine in both conditions; but there was more associated lipoid and usually much larger quantities of globulin were passed in leaky kidney cases. The hope was expressed that the subject of globulinuria would receive attention, and that the tests would be applied to every urine where albumin had been detected, especially where no obvious cause for its presence had been determined. The above tests proved far more reliable than merely testing the urine for albumin, or than assessing the doubtful significance of certain types of casts in determining the nature of the case.

Dr. H. BATTY SHAW reported on a case of

An Unusual Form of Turbid Urine due to the Presence of Lecithin-Globulin.

The patient, a young man of 37, had suffered from what appeared to be albuminuria for 18 months, and for the first half of this period was diffusely dropsical. Casts of a fatty character were found in his urine, so that the case appeared to be one of chronic parenchymatous nephritis. The patient had suffered from syphilis eight or nine years previously; but the nephritis was probably not due to this infection because the Wassermann test was always negative. The urine presented two special features which were of interest to the clinician. It was uniformly turbid on several occasions, and the turbidity was not due to micro-organisms; further, the usual tests for albumin produced a most bulky precipitate which appeared to be supported in a gelatinous matrix. These two unusual features were elucidated by Dr. Mackenzie Wallis, who showed that the protein present was globulin and not

albumin, and that the turbidity of the urine was due to the inability of the urine to maintain in solution the large amount of the complex which was present—namely, lecithin-globulin.

This case differed from the cases described by Dr. Mackenzie Wallis in that the globulin was present not in a case of functional disorder, but in a case which appeared, clinically at least, to be one of chronic parenchymatous nephritis. It was of further interest because it was the first case described in which turbidity of urine was due to the presence of lecithin-globulin, a complex which, as Dr. Mackenzie Wallis had shown elsewhere, is responsible for the turbidity and milky-like appearance met with in chyliform or pseudo-chylous ascitic or pleural effusions.

Report on Three Cases.

Dr. W. J. TYSON reported three cases. Case 1 was that of a man, aged 70, whose urine had been tested first in 1905 and frequently up to the time of his death in 1914. Albumin had always been present, but the quantity had varied from a slight amount to absolute solidity. It increased with any feverish cold. A very careful examination had been made in Switzerland in 1907, when the report stated that the urine was acid, of specific gravity 1007, without sugar or casts, but containing much albumin. He never had signs or symptoms of Bright's disease, no œdema or dropsy, no increase of pulse tension, no eye troubles. Case 2 was that of a man aged 76, who for 17 years had had albuminuria varying from enough to cause solidity on boiling to 1/10 by Esbach's method. His pulse tension was not high. He was liable to giddy attacks and transient aphasia. Case 3 was that of a woman aged 70. When first seen in 1911 she was insensible and pulseless, and the urine solidified on boiling. Within two days the patient became sensible, the albumin disappeared, and she became otherwise normal. There was no further evidence of Bright's disease. He had seen no other cases similar to the above. The enormous amount of albumin present at times, with practically an absence of it at other times, and with none of the ordinary symptoms or signs of Bright's disease, seemed to warrant the placing of these cases in a class by themselves. These people lived for a long time and carried on their life and duties as usual. He thought that the passage of albumin with or without hyaline and finely granular casts was a comparatively common condition, especially in those over 50 years of age, and was of little or no practical importance. That people reaching middle life had often been rendered miserable by the finding of albumin there was no doubt.

Sir NESTOR TIRARD said that Dr. Mackenzie Wallis's work constituted a distinct advance. He asked what was the cause of death in Dr. Tyson's first case, and on learning that it was from double pneumonia, inquired whether the patient had previously undergone salvarsan treatment. In certain cases recorded by Byrom Bramwell, in which salvarsan had been employed in the treatment of anæmia, death from pneumonia had taken place. Hyaline casts he regarded as of very little importance. Centrifugalised fresh urine might show hyaline casts, but they might disappear if the urine stood for some hours; he believed that they became dissolved. He expressed himself as still unrepentant, as an examiner for life assurance, of advising extra premiums in cases with albuminuria, in the present state of our knowledge.

Dr. O. LEYTON recorded a case of a man, aged 35, whose urine when he first examined him became solid on boiling. Eighteen months later the urine still became solid and serum-albumin was in excess. The blood pressure was not raised and there were no ocular changes. *B. coli communis* was present in the urine. Some years before he had suffered from gonorrhœa, the urine had not cleared after this and he had been in the habit of taking hexamine freely. Ten years later his prostate was removed, but the kidneys were still efficient, and the operation was performed without difficulty. He was now 90 years old. There had been recognised albuminuria for 14 years and he was still healthy. In cases of postural albuminuria calcium lactate had appeared to diminish the albumin.

Dr. J. H. THURSFIELD said that the patients with "albuminuria" who were particularly interesting were those who were rejected for life assurance, or whose premiums were heavily loaded. There were such patients without nephritis and without any tendency to it. The majority of these were passing lecithin-globulin. There were no casts and no other symptoms of nephritis, with the exception that a few had œdema of the feet. The œdema he regarded not as true renal œdema, but as being in the same category as similar œdema met with in orthostatic albuminuria. In orthostatic albuminuria in children the abnormal protein passed was almost entirely or wholly serum-globulin, and these children occasionally had œdema of the feet. It was the duty of insurance medical officers, when confronted with albuminuria without signs of Bright's disease, to see whether it was globulin which was present, for in that case the candidates could be insured as first-class lives with absolute safety.

Dr. R. HINGSTON FOX said that the insurance officers did not hold so restricted or ignorant views as seemed to be implied. The question of albuminuria without nephritis had been muddled by a multiplicity of terms. He was familiar with cases of harmless albuminuria. Typically they were cases of rapidly growing young men, pale, suffering often from headaches, easily flushing, and with readily elicited "tache." In such cases calcium lactate almost always removed the albumin temporarily if given in doses of a drachm on two successive evenings. Insurance officers passed these cases with little modification. Whether the condition was altogether free from ill-effects was still a matter of opinion, and from the point of view of insurance it was therefore justifiable to decline to treat the individuals as first-class lives.

Dr. W. P. S. BRANSON said that insurance medical officers did not treat candidates with "albuminuria" in so unreasonable a way as some seemed to suppose. The difficult case was that of the man of from 35–45 who came for the first time with albuminuria.

Dr. MACKENZIE WALLIS, in his reply, said that he knew of three cases of syphilis in which globulinuria persisted after salvarsan treatment. Cystoscopic examination in cases of orthostatic albuminuria had shown that no urine emerged from the left ureter when the patient was standing, which suggested that the albuminuria was due to pressure on the left renal vein.

SECTION OF OBSTETRICS AND GYNÆCOLOGY.

EXHIBITION OF CASES AND SPECIMENS.

A MEETING of this section of the Royal Society of Medicine was held on April 8th, Mr. J. D. MALCOLM, the President, being in the chair.

Douche-nozzle Removed from the Female Bladder.

Mr. T. G. STEVENS showed a specimen of a gum-elastic douche-nozzle, the third which he had had occasion to remove from the female bladder. It had been in the bladder nearly three months and a severe cystitis had developed. The bladder was incised per vaginam and the nozzle found to be so encrusted with phosphate crystals as to require cutting in half before removal. The bladder was sewn up at once with catgut, the vagina having been separated ¾ in. all round the opening and sutured separately. A self-retaining catheter was inserted and removed on the tenth day, when the urine was almost free from pus and the incision was apparently healed. A few days later there was a transient doubtful leakage, but the patient was discharged three weeks after the operation, able to hold urine all night without inconvenience. The severe cystitis did not prevent the healing of the incision in the bladder.

Dr. AMAND ROUTH said that the vaginal route was undoubtedly the best for removing such a foreign body, but his practice was to leave the bladder open.—Dr. HERBERT SPENCER suggested that the specimen might have been cut in half and removed through the urethra by means of a Kelly's tube.—Dr. A. LAPTHORN SMITH agreed with Mr. Stevens's method, except that he

preferred to make the incision in the vagina ¼ in. to the right of the middle line, and that in the bladder ¼ in. to the left, to avoid leakage.—Mr. STEVENS in reply said that the difficulties encountered in the previous cases in trying to remove the nozzle per urethram had prevented him from repeating the attempt. As to sewing up the bladder, he had left his first case open and it had not healed readily, so he sewed up the two subsequent cases with complete success.

Cystic Embryoma of Ovary.

Mr. J. D. BARRIS showed a specimen of Cystic Embryoma removed from a nullipara, married one year previously. There was a history of two months' abdominal pain; menstruation normal. A pseudo-mucinous ovarian cyst was removed from the right side. The specimen shown consisted of the left ovary, opened to show an upper cystic and a lower solid unaffected portion, and was unusual in that it showed a *pedunculated* dermoid situated within a cyst cavity lined by old blood clot.

Combined Placenta Prævia and Accidental Hæmorrhage.

Dr. EARDLEY HOLLAND gave a short account of a case of Combined Placenta Prævia and Accidental Hæmorrhage. The patient was a primigravida of 28. When first examined, after she had bled moderately for about four hours, the placenta was felt overlapping a cervix dilated to the size of two fingers. She appeared more anæmic than was warranted by the amount of blood lost externally. The uterus was hard and irritable, and the urine contained a dense cloud of albumin. A leg was brought down and continuous weight-traction made upon it. She soon delivered herself of a dead fœtus. The placenta, which followed almost immediately, was accompanied by a large dark clot of about 14 oz. of blood. Examination of the placenta revealed a typical, sharply localised depressed area in the middle of the maternal surface and occupying about one-third of its area. Blood clot was still occupying parts of this depressed area, and closer inspection revealed some adherent laminæ of greater age. The opening in the bag of membranes was at the margin of the placenta. Dr. Holland said that this was a true case of placenta prævia combined with toxæmic retroplacental hæmorrhage. There was no inherent reason why such a combination should not occur. As the frequency of placenta prævia was given as 1 in 1000 and that of accidental hæmorrhage as about 1 in 500, by the laws of chance the combination should occur about once in every half-million cases of placenta prævia.

Infected Fibromyoma of the Uterus.

Dr. HOLLAND then showed a specimen of an infected fibromyoma of the puerperal uterus removed by hysterectomy. The patient was admitted into the London Hospital with all the signs of an acute generalised peritoneal infection; a tender, hard tumour was felt rising above the pelvis, the size and shape of a uterine pregnancy of 24 weeks' duration. She had been delivered of a dead premature fœtus three weeks previously; the placenta had been removed manually three days after labour. Immediately after admission the uterus was removed by subtotal hysterectomy; the peritoneal cavity was drained through the vagina and through the abdominal wound. The patient died in 36 hours. The whole of the anterior wall of the uterus was occupied by a single, spherical, necrobiotic fibroid, 15 cm. in diameter. The particular interest in the specimen lay in the fact that there were two perforations of the capsule of the fibroid on its anterior peritoneal wall, and one perforation through the posterior wall of the capsule into the infected uterine cavity. Between these perforations was a continuous purulent track, lying between the fibroid and its capsule, and forming a path of infection from the uterine to the general peritoneal cavity. The perforations were, no doubt, due to acute necrosis from a virulent infection acting on a capsule rendered tense by the rapid swelling of the fibromyoma it contained.

Extensive Fatty Change in Fibromyomata.

Dr. HERBERT WILLIAMSON and Dr. R. St. L. BROCKMAN submitted a short communication on two specimens, one showing a Fibro-myo-lipoma of the Uterus, and the other Extensive Fatty Degeneration of Uterine Fibromyomata. The first specimen was from the museum of St. Bartholomew's Hospital, and showed an ovoid, encapsuled tumour composed of fat, situated in the interior of the uterine fibromyoma. Microscopical sections of the tumour showed that it was a true lipoma, and that the fat was contained within typical fat cells. The authors described six similar tumours of which descriptions had been published, and referred also to another specimen in the museum of the Royal College of Surgeons of England. They discussed the origin of such tumours, and preferred the term fibro-myo-lipoma to the terms lipomatosis and fatty metamorphosis, inasmuch as it involves no theory of origin. They saw no difficulty in accepting the view that these tumours arose from the metamorphosis of fibrous tissue or muscle cells of a fibromyoma, since such a metamorphosis had been proved in the case of sarcoma cells, but as no transition forms had yet been demonstrated the matter could not be regarded as proved. They drew attention to the fact that, with one exception, all the tumours were removed from patients over 50 years of age, having given rise to bleeding after the menopause. The second specimen was shown as a contrast; it consisted of a transverse section through a mass of uterine fibromyomata. In the recent state these appeared to consist of yellow fat, and oil globules could be scraped from the surface. The sections showed that the presence of fat was due to extensive fatty degeneration, and that the fat was not contained within typical signet-ring cells, as in the specimen first exhibited.

Dr. CUTHBERT LOCKYER said that the question for decision was whether the condition in these cases was a degenerative change or a neoplasm. The familiar fatty degenerations of fibroid, whether red, white, or yellow, were of a granular lipoid nature, in no way resembling the sunset-coloured signet-ring shaped cells described by Dr. Williamson and Dr. Brockman, and also found in the speaker's own case. He had eliminated the possibility of a neoplasm in his case, and therefore objected to the nomenclature advocated by the authors. He considered that the change affected the muscle rather than the fibrous tissue fibres, as he had traced globules running in the direction of the muscle fibres and could distinguish nuclei in them.—Mr. STEVENS thought that the incomplete encapsulation and the strands of fibro-muscular tissue running into the fatty mass were points against a neoplastic origin. A lipoma consisted of fibrous tissue and fat only, while myo-lipomata were unknown.

A Case of a Pregnant Woman with High Ammonia Coefficient.

Lady BARRETT described a case of a pregnant woman with a high ammonia coefficient and persistent vomiting, who recovered and gave birth to a normal living child at term. The patient, a munition worker aged 22, was admitted to the Royal Free Hospital with persistent frequent vomiting when about six weeks pregnant. The vomiting was accompanied by constipation and treated by dieting, with occasional success, till a month after admission it became more severe and diacetic acid appeared in the urine, which was scanty (7 oz. in 24 hours), and contained also a faint trace of albumin. The vomiting improved for two days, during which the patient had Benger's food by the mouth, but it started again and she was put on glucose saline per rectum, with the subsequent addition of albumin water and tea by the mouth. The ammonia coefficient rose to 38 and subsequently to 78, and the quantity of urine passed in 24 hours varied from 5 to 24 oz. daily. The vomiting ceased gradually, and the diet was increased in protein content in the hope that the ammonia coefficient, which still remained at 50, would decrease on a more generous intake of nitrogen. This hope was realised, and about eight weeks after admission to hospital the vomiting had practically ceased, the ammonia coefficient had fallen, and the urine excretion risen. After a slight relapse the patient's condition improved steadily, and she was discharged 12 weeks after admission. She

was readmitted when 6½ months pregnant, with loss of appetite, drowsiness, and persistent vomiting. The ammonia coefficient was then only 5 to 7 and she was discharged 10 days later. She was delivered at term, after a normal labour, of a girl weighing 5 lb. 9 oz., jaundiced at birth; mother and child both did well. For nine months, during which the patient was kept under observation, the ammonia coefficient remained between 5 and 8. She then became pregnant again, about 5 months ago, and is now under observation. The ammonia coefficient remains low and the patient well. Lady Barrett suggested that the successful termination of the case, the progress of which had been watched from day to day with a view to inducing labour if necessary, indicated that the general condition, pulse, and quantity of urine passed, and the presence or disappearance of diacetic acid in the urine, were of more importance in deciding on the need for induction than a high ammonia coefficient.

The PRESIDENT congratulated Lady Barrett on her successful conduct of the case.—Dr. MACKENZIE WALLIS said that the case was very surprising. He had never come across an ammonia coefficient higher than 38. He asked whether the nitrogen in the blood, and the diastase in the urine, had been estimated. The latter sometimes remained high for a long period. He was struck by the small quantity of diacetic acid present.—Dr. T. W. EDEN described a case differing from Lady Barrett's, but also illustrating the vagaries of the ammonia coefficient. Possibly the explanation of the excellent result notwithstanding the high figure found by Lady Barrett was that it was due to the starvation following on the vomiting rather than to toxæmia.—Lady BARRETT, in reply, said that separate estimates of amino acids had not been made in the first illness. Since then the amino acids had been present in small proportions relative to the ammonia. Diacetic acid was only rarely present. Diastase had not been estimated.

The Value of Blood Transfusion before Operation in Severe Secondary Anæmia.

Dr. HERBERT WILLIAMSON contributed a Note on the Value of Blood Transfusion before Operation in Severe Secondary Anæmia, reported in full on p. 867 of our present issue.

In reply to a question by Dr. ROUTH, Dr. WILLIAMSON said he never used saline injections since the blood pressure was not increased thereby, but the saline filtered through into the tissues, causing œdema. He had had good results with 6 per cent. gum arabic in saline—though not so good as with blood—and this solution had the advantage that it could be stored and used when blood was not available.

Rupture of the Vagina during Labour.

Dr. A. C. PALMER described two cases of Rupture of Vagina during Labour, admitted to the Obstetric Department of the London Hospital. An 8-para, aged 35, was brought by her doctor, who stated that the case was one of prolonged second stage with the head delayed in the pelvis. He had extracted a child, still-born, weighing between 13 and 14 lb., after a hard pull with forceps. The perineum was torn. The placenta did not follow and since the patient continued bleeding he decided to remove it manually. Following the umbilical cord, his hand passed into the abdominal cavity, where he found and removed the placenta. The case was then brought up to hospital; P. 120, T. 98° F., abdomen very tender. The uterus was found almost completely separated from the vagina, except for a narrow bridge in the region of the left uterine artery, and a small portion of the anterior wall of the cervix close to the bladder. There was much free blood in the peritoneal cavity. The uterus was removed as rapidly as possible, and the patient made a good recovery. Dr. Palmer believed that the difficulty was due to relative pelvic contraction owing to the very large size of the child. The second case, also a multipara, was brought to hospital in a state of collapse (P. 120, T. 96·5°) by a midwife, having been in labour for 24 hours. There had been good pains for 15 hours, and since then the pains were described as tempestuous and different in character from the preceding ones. No manipulation and only one vaginal examination had been made. On the right of the fœtus was a hard tumour about the size of a fœtal head, and thought by the resident accoucheur to be possibly a fibroid. A moderate pull with forceps being unsuccessful, the child was delivered after perforation and crushing of the head by Mr. V. J. F. Lack, the resident accoucheur, who then noticed that the tumour was the contracted uterus and that the child had been lying in the abdominal cavity, whence the placenta was removed manually. At an exploratory laparotomy Dr. Palmer found a large T-shaped tear in the posterior vaginal wall, beginning at the cervico-vaginal junction and extending almost down to the vulva, and much free blood in the peritoneal cavity. The uterus was rapidly removed. The patient is now convalescent. Four easy labours had occurred in spite of well-marked general contraction of the pelvis; the fifth had required forceps; the sixth was the case described. In each case the object of the hysterectomy was the control of hæmorrhage and the removal of damaged and devitalised tissue as a prophylactic against puerperal sepsis.

Sacculation of a Gravid Bicornuate Uterus.

Mr. T. G. STEVENS described a case of Sacculation of a Gravid Bicornuate Uterus. The patient was admitted to St. Mary's Hospital in great pain, having been in labour two days. The uterus, nearly full term in size, was not contracting very powerfully and the fœtal head was at its upper part. Per vaginam the os was out of reach and a fluctuating swelling filled the upper half of the pelvis behind. Pulse 104, temperature 97° F. Three months previously an immovable swelling, then smaller, had been felt by Mr. Stevens behind the cervix; it was then diagnosed as an ovarian cyst and left, with the idea that during labour the cyst could be removed by operation and delivery then completed per vias naturales. As the cervix could not be reached it was, however decided to perform Cæsarean section and then to deal with the tumour. The fœtus having been extracted from an apparently normal uterus, this was drawn through the abdominal incision and the pelvic swelling was found to be a sacculation of the uterus itself, formed by the slightly distended posterior wall. The actual fundus was held down in the pelvis by an adhesion 1¼ in. broad by ¼ in. thick. Further, a solid projecting mass, proving to be the enlarged, thickened, but not expanded, half of a bicornuate uterus, was found attached to the left side of the expanded anterior part of the uterus. The cervix was located as a flattened structure, hardly at all dilated, in front of and below the impregnated half of the uterus, and making an acute angle therewith. Both mother and child did well. Mr. Stevens said that sacculation of the gravid uterus was a rare condition, usually attributed to retroflexion in early pregnancy, but in this case due to the adhesion of which the cause remained obscure.

LIVERPOOL MEDICAL INSTITUTION.—A meeting of the Pathological Section of this society was held on March 18th, Dr. J. F. Gemmell, the President, in the chair.—Professor Ernest Glynn contributed a critical review of so-called "ovarian hypernephromas." He was of the opinion that such tumours were exceedingly rare if they ever did occur, and gave three reasons for his view: 1. There was only one recorded case of a cortical rest *in* the ovary (1913) and even this was doubtful and unconfirmed by other observers. Such rests were undoubtedly found frequently in the broad ligament. 2. Ovarian hypernephromas were never associated with hirsuties and changes in the sex characters so common in primary neoplasms of the adrenal cortex in women before the menopause. 3. There was little, if any, difference, clinically and histologically, between ovarian tumours described as "hypernephroma" and as "malignant lutein" formations respectively, yet both these tumours were apparently quite unlike true neoplasms of the adrenal cortex itself.—Dr. G. F. R. Smith read a paper on the urine after anæsthesia based on a quantitative investigation of acidosis following various types of anæsthesia. He noted the development of acidosis after ethyl chloride and ether as well as chloroform and discussed predisposing causes. He was of the opinion that warmed ether given by the open method to a patient not unduly starved before operation was the safest anæsthetic available.

Reviews and Notices of Books.

ENTOMOLOGY FOR MEDICAL OFFICERS.

Second edition, revised. By A. ALCOCK, C.I.E., M.B., LL.D., F.R.S., Professor of Medical Zoology in the University of London, Lecturer on Entomology (Medical) at the London School of Tropical Medicine, &c. London: Gurney and Jackson. 1920. Pp. 380. 18s.

ENTOMOLOGY is a subject of surpassing interest, and no branch of it is more so than that dealing with the part insects play in the spread of disease. We advise those wishing information on the subject to get a copy of Colonel Alcock's book, a second edition of which has just been published. Dedicated to Sir Patrick Manson, the founder of modern tropical medicine, the book is replete with information and pleasant to read. Take, for example, the opening paragraph, on p. 31, to the chapter on Insecta; here the author says: "It is sufficient to say that insects outnumber all other species of animals put together, that it is impossible to over-estimate their natural influence and momentum, and that so far as their relation to civilised man is concerned insects have in various ways retarded his most resolute efforts to replenish the earth, and have at times and in places disputed his very dominion." So true is this that it behoves all medical practitioners, and especially those whose lot is cast in the hot parts of the earth, to have much more than a smattering of knowledge of the subject. Both medical man and layman, not specially trained as entomologists, will find all that they require in these pages.

A PRIMER OF TROPICAL HYGIENE.

Sixth edition. By Colonel R. J. BLACKHAM, C.B., C.M.G., Assistant Director of Medical Services. Bombay: G. Claridge and Co. 1919. Pp. 154. Rs.1.

WITH the extension of foreign and colonial trade and the opening up of the African continent the number of people who would benefit by a knowledge of tropical hygiene will be considerably increased, and we therefore welcome a new edition of Colonel Blackham's excellent primer. The fact that it has gone through five editions in as many years testifies to its popularity, and its usefulness is also emphasised by its adoption as the official handbook for the classes at the College of Ambulance for teaching Europeans the rules of health in tropical and subtropical countries. The chapters, of which there are 12, deal with ventilation, water-supply, and various aspects of personal and public hygiene.

MANUAL OF OBSTETRICS.

Second edition, revised. By EDWARD P. DAVIS, A.M., M.D., F.A.C.S, Professor of Obstetrics in the Jefferson Medical College, Philadelphia. London and Philadelphia: W. B. Saunders Company. 1919. Pp. 478. 15s.

THE appearance of this second edition has been delayed by the war. The section dealing with the differential diagnosis of early pregnancy has been revised. Great stress is laid on Hegar's sign, but as the student is not definitely told what the author means by this sign he is not likely easily to recognise it. In the description of chorion epithelioma we are told that a layer of fœtal cells called the syncytium covers the villi, but no mention is made of Langhans' layer. There is no account of the exact pathology of hydatidiform mole; the student is told that the diagnosis is made by the rapid increase in the size of the uterus and the passage of masses of small cysts, but nothing is said of the many cases in which neither of these signs is present. The author favours ether as an anæsthetic for labour cases and is evidently not in favour of twilight sleep. A good account is given of the modern method of performing Porro's operation in cases where the uterus is infected, and it is not safe to drop the stump back into the peritoneal cavity after hysterectomy. The book is an interesting one, but it is intended for the students attending the author's lectures at the Jefferson Medical College, and the teaching differs in many particulars from that prevalent in this country.

PHYSIOLOGY OF THE CENTRAL NERVOUS SYSTEM AND SPECIAL SENSES.

For the Use of Students. Third edition. By N. J. VAZIFDAR, L.M. & S., Assistant Chemical Analyser to Government of Bombay. Bombay: S. Govind and Co. 1920. With 18 illustrations. Pp. 210. Rs. 3.12.

THIS opuscule has obviously undergone considerable emendation since we reviewed it in THE LANCET, Dec. 7th, 1912, but it is still capable of improvement. In dealing with the size of nerve cells, nowhere is any definite size stated; neuro-fibrils of nerve protoplasm are not, as stated, easily demonstrated by Cajal's method. Proof-reading is defective, as shown by such mistakes as the following: Dieters, Billarger, headace, Gower's Tracts, apperture, intensitive, Danders, pulviner. There are many others. It would be difficult to recognise a Pacinian corpuscle from the description given on p. 144, or to demonstrate the blind spot from the directions on p. 187, where the asterisk and † are reversed in position. We are told that "the elasticity of the lens is best seen when it is removed from the eye of a young person; it immediately assumes a spherical form." The rods and cones do not rest on the external limiting membrane, nor is "the path of taste sensations" from gustatory cells through the "lingual nerve and then through the chorda tympani." It requires a thorough knowledge of a subject to be able to make an accurate compilation, which this can hardly be said to be; still, in its broad outlines it may prove useful for those students for whom it is written.

MEDICAL GUIDE FOR INDIA AND BOOK OF PRESCRIPTIONS.

By Lieutenant-Colonel E. J. O'MEARA, O.B.E., F.R.C.S. Eng., D.P.H. London and Calcutta: Butterworth and Co. 1920. Pp. 722. Rs.12.

THE guide is designed as a ready reference of domestic medicine, especially for students and practitioners in India. It is a careful compilation, and should prove very useful if its employment is limited to the scope laid down in the preface. Obviously, in short paragraphs of potted medicine the teaching must be dogmatic, but the author has been careful in the avoidance of dangerous doctrines. A most interesting section deals with the indigenous drugs of India. Colonel O'Meara is convinced that the native physicians possess prescriptions which are "of great use," but any attempt to extract information is met with "courteous but absolutely evasive answers." The knowledge which is withheld should prove a stimulus to research in a not unpromising field, and the author is expecting important achievements from a committee on indigenous drugs which has been appointed in Bombay.

ELECTRICAL TREATMENT.

Third edition. By WILFRED HARRIS, M.D., F.R.C.P. London: Cassell and Co., Ltd. 1919. Pp. 354. 9s. net.

THE general plan of this edition of Dr. Harris's "Electrical Treatment" remains unchanged. As in the second edition, the major portion of the book deals with the faradic and galvanic currents—their production and the maladies which can be treated by them, particularly those of the nervous system. Considerable space is devoted to descriptions of the pathology and symptoms of some of the diseases of the nervous system. A clear account is given of the medical coil and galvanic cells and batteries. Two chapters are devoted to the sinusoidal current and its medical uses. One of these chapters contains an interesting account of dynamos and motors. The author frequently uses the term "cataphoresis" in place of ionisation. The older term should be discarded as it really means a transport of fluid from the anode towards the kathode and not the migration of ions. Although static electricity and high-frequency currents are very briefly considered and less than a page is devoted to diathermy, this book will form a useful addition to the library of the practitioner of electrotherapeutics, and will be a valuable guide in the treatment of diseases of the nervous system by simple electrical methods. It is well prepared and there is a good index.

THE LANCET.

LONDON: SATURDAY, APRIL 17, 1920.

The Future of the Hospitals.

THE voluntary hospitals, like many persons and other institutions, are feeling the pinch of the war, but their needs, as put before the public imagination, represent them as in a desperate plight. We trust our readers to take every opportunity which opens itself before them to paint a more accurate picture of the circumstances than is thus conveyed, while it is fair to ask certain critics of the voluntary system to be more certain of their ground and more specific in their statements. Before the assertion is made that the voluntary hospital system is doomed, we want to know whether it has broken down at all or whether the acknowledged pecuniary stress under which the work is being carried on is, at any rate to a large extent, an expression of the general condition of our social world—whether, in other words, we are dealing with circumstances which, however grave, should be temporary and not imply permanent failure. Our contemporary *The Hospital* protested recently against persistently pessimistic estimates of the future of voluntary hospitals, pointing out that if the voluntary system, as it existed before the war, is inadequate in the present situation, as proved by what the war has left behind it, the lesson is not that the voluntary system has broken down, but rather that it requires an added support commensurate to added needs. This was much the view put forward in these columns when we were dealing with the voluntary hospitals of the metropolis, premising that if in the metropolis the voluntary principle was not condemned it might be assumed to have reasonable chances of living elsewhere. The figures supplied in the last statement issued by King Edward's Hospital Fund for London on the present position of the London voluntary hospitals showed that for the time being an increase of little more than 10 per cent. in the annual subscriptions would meet the net deficiency; and when it is remembered that we are talking of a total annual expenditure of well over two millions it will be seen that, so far as London is in question, the voluntary system is no failure.

London, however, in matters of social administration, can never be taken as typical of the rest of the country, while those who by training, temperament, and experience are most closely wedded to the voluntary principle, admit that the time has come when a certain amount of State or municipal aid will be required if the hospitals are to play their proper part in a world that is developing with good intentions, though often upon profoundly uncomfortable lines. Now, it seems to us to be quite impossible for anybody at the present moment to speak with exactitude as to how this aid should be supplied and in what selected directions it should be employed. The necessary knowledge is simply not before us, and those who draw deductions as to the permanent failure of the voluntary system from particular complaints emanating from certain institutions are unwisely hasty. At this juncture we want, and we are shortly going to obtain, wide and accurate information as to the real incomes, expenditures, and services of all the larger voluntary institutions; then and then only can we gauge, with truth and justice, both what is the measure of success or failure, and what are the directions in which the State or the municipality can, and should, come to the rescue. The Red Cross has already distributed large sums of money, and proposes to raise further money under a scheme of equivalently large prevision, whereby funds to hospitals will be supplied according to the merits of the institutions, the national needs which they meet, and their standards of economy and efficiency. The information thus needed at the centre is being carefully collected—and the time, patience, and energy comprised in the word "carefully" will surprise all; and when the time comes for action, the grants, donations, and pecuniary support will be offered by the Red Cross with a single eye to raising the general standard of hospital treatment and management. Supported in this way by help in the right places and at the right times, voluntary subscriptions, we are sure, will go far towards meeting the immediate case. But the Red Cross scheme will also contain suggestions whereby the hospital population may itself be diminished, by the foundation of convalescent homes among other things, and by the proper development of after-care associations, while central buying schemes are proposed whereby sporadic extravagances may be eliminated in the cost of food and nursing material. The lesson of all this seems to us to be that in such circumstances it is short-sighted to ask the public at the present juncture for more money to add more beds to particular institutions; these may not be found necessary in the particular place where it is proposed to supply them, when the need for beds is estimated under some general plan over an orderly selection of areas.

To quote a phrase once familiar in educational circles and already applied by ourselves to the present position of hospitals, the duty of the State should be, at any rate for the present, that of supplementing the voluntary hospitals, not of supplanting them; but it is necessary that those who use this argument should be able to say in what particular directions the State or county or municipal subsidy should be sought. The attempt has been to institute some parallel between what happened and is happening in education and what will happen in hospital provision. It will be remembered that the main reason for the existence of voluntary schools, when State elementary education was provided,

was that the voluntary schools preserved the religious element. They were allowed to continue their work, the State taking over the responsibility of part of the maintenance, that for the buildings remaining with the foundation managers. At the present moment there are numerous voluntary schools, whose measure of independence is respected and whose work is highly valuable. Has not this position a lesson for us in respect of the voluntary hospitals, especially if we consider the case of continuation rather than elementary schools? For hospitals should not be classed as elementary institutions; they are more comparable to continuation and special schools, for only those patients should find their way to hospitals whose needs have not been already met in the ordinary routine of panel practice. If we regard the hospital population of the country as composed to some extent of defectives from physical standard, it would certainly seem logical that the State should assist along all the special lines needed to prevent and to recuperate.

Food Pigments and Accessory Food Factors.

AN interesting suggestion in regard to the nature of the fat-soluble accessory food factor is made in an article published in our present issue. The authors, Dr. O. ROSENHEIM and Dr. J. C. DRUMMOND there record the results of a number of experiments carried out with the view of ascertaining whether the accessory substance is related to, or is identical with, a member of the class of pigments which are found in association with fats. These pigments are termed lipochromes and typical examples occur in the yellow pigment of egg-yelk, butter-fat, and in vegetables, all of which are known to possess either growth-promoting or antiscorbutic or antineuritic properties, or all three. These researches gave promise of isolating the active accessory constituent, but the authors come to the somewhat disappointing, if interesting, conclusion, that, whilst the identity of the fat-soluble accessory food factor with a known lipochrome pigment appears to be improbable, there are reasons for assuming that it is in some manner associated with this group of substances. It is a remarkable fact, at all events, that the colour of body-fat, milk-fat, or egg-fat is derived from the lipochrome pigments ingested in the diet.

The normal yellow colour of butter is known to be due to carrotene,[1] a hydrocarbon with high oxygen absorption capacity, and, besides, there is present xanthophyll, similarly constituted, but with two atoms of oxygen attached. It is significant that these pigments have their origin in the grass and roots consumed by the cow, and an interesting fact is that, should the source of these pigments be cut off, as for example, by maintaining the animal on a diet of bleached hay and white corn, the butter-fat becomes progressively paler until it is practically white. Should further investigation confirm an intimate relationship between the lipochromes and the fat-soluble accessory factor, and possibly the water-soluble factors too, new questions will arise as to the bleaching of food products. Fresh evidence would then possibly be acquired of the dietetic deficiency of the white loaf, and the dyeing of milk with annatto would mean a false sense of security as regards the presence of a growth-promoting factor. The evidence so far that lipochromes are necessarily associated with important nutritive factors, though not convincing, may give a much-desired clue as to their nature and composition. It is very suggestive, at all events, as evidenced by a table presented by the authors, that the distribution of lipochromes and fat-soluble A in a number of fats runs parallel. In those cases where a negative is recorded for lipochromes, as with white fish, lard, and vegetable oils, so also is a negative recorded for fat-soluble A. That alone is remarkable, and we welcome the authors' announcement that they are pursuing the matter further. The question of pigments playing a rôle in nutrition is all the more interesting when we remember how important is the function of chlorophyll in plant life and of hæmoglobin in animal life.

In an interesting paper on a related subject, also published in our present issue, Dr. E. MELLANBY deals with the question of accessory food factors in the feeding of infants. The subject was discussed at a meeting of the Royal Society of Medicine held on Feb. 17th, and the proceedings were reported in THE LANCET of March 13th (p. 604). The article is illustrated with an interesting series of photographs of puppies fed on a rickets-producing diet, and a group of radiograms of the wrist-joint is reproduced showing when rickets did or did not occur. Coming to practical considerations, Dr. MELLANBY referred to the remarkable immunity from rickets enjoyed by Jews as against Gentiles amongst school children. It is a significant fact that the dietary of the former includes much fatty food, oil, eggs, and milk, while such food materials do not form a substantial part of the dietary of the latter. These results appear to be in complete agreement with a valuable series of biological experiments conducted in the laboratory which we have consistently recorded. The useful observations were made by Mr. WILLIAM HALL, in Leeds, as far back as 1902, when the presence of the antirachitic accessory factor in food was undreamt of. The inference (backed by a consideration of the remarkably good health of the children in the Hebrides brought up on breast-milk and a surplus of fatty foods, including fish liver) is that inferior physique in infant life depends not so much on environment as upon diet deficiency. Practical returns of this kind show us that the energetic work of our biologists is proceeding on illuminating lines.

[1] Chemical Society Nomenclature.

The Medical Problems of Life Assurance.

WE publish in our present issue an interesting and suggestive paper by Dr. T. D. LISTER under the above heading, being an abstract of the presidential address delivered before the Assurance Medical Society on March 12th. The problems of assurance medicine are varied and somewhat complex, since they involve, for the most part, questions of prognosis, which are almost proverbially dangerous and difficult in regard to individual cases. At the same time, as Dr. LISTER points out, there is some safeguard to the assurance medical officer at the head office in the fact that he has rather to place "lives" in classes than to insure individuals. Medico-actuarial calculations afford statistics of real value in prognosis, and they have perhaps not received the general attention they deserve. Collective investigation of assured lives and later, if it be possible, of declined lives would probably afford most valuable data to medicine in general as well as to assurance medical officers. Dr. LISTER'S rather happy illustration of "vital trajectories" is an idea which might be developed with very good results.

It is of interest to note that one of the problems to which Dr. LISTER referred has been considered recently by the Section of Medicine of the Royal Society of Medicine—viz., that of Non-nephritic Albuminuria; and we publish on p. 868 an abstract of the paper on this subject by Dr. MACKENZIE WALLIS and of the discussion which followed. We can commend the perusal of this paper and discussion to our readers, especially those who are concerned in the examination of candidates for life assurance. It would appear that in non-nephritic cases the chief protein in the urine is euglobulin often in combination with lipoids. It is of special interest to note that the tests for the recognition of this substance and its differentiation from albumin are simple, easy of employment, and do not require much time for their application. From the discussion, at which some assurance medical officers were present, it is evident that there is no uniformity of opinion or practice in dealing with cases of albuminuria in candidates for life assurance. We believe the usual custom is to postpone the candidate for further investigation of the urine and to accept the proposal, with or without some slight loading, if the condition is of the nature of functional or cyclical albuminuria. Further research on the lines set out by Dr. WALLIS appears likely to simplify the problem for the examiner by affording an easy method of distinguishing the "albuminurias" of organic origin from those of functional nature.

A further aspect of life assurance medicine was raised in a recent paper by Dr. R. T. WILLIAMSON, dealing with the discovery of glucose in the urine of candidates for assurance. He gave some valuable suggestions for dealing with this class of case, and we feel that his suggestion that in such cases the examiner should be permitted to communicate the fact to the proposer is one well worth considering. We believe in practice this is frequently done, although the general rule is that the examiner should not communicate any opinions as to his examination to the proposer. This question and similar problems of the relation of the medical examiner to the proposer have been recently debated in our columns, and offer a useful subject for discussion at the Assurance Medical Society.

Annotations.

"Ne quid nimis."

THE NEW ORLEANS SESSION OF THE AMERICAN MEDICAL ASSOCIATION.

AFTER an interval of 17 years the American Medical Association is again holding its annual gathering at New Orleans, with 435,000 inhabitants, the southernmost centre of the great constituency. Fifty-three constituent associations send their representatives to this gathering, the numbers varying from 11 for New York and eight for Illinois down to one each for the smaller States. The 15 scientific Sections of the Association send one delegate each, as do also the medical services of the Army and Navy and the Public Health Service. The House of Delegates meets on Monday, April 26th, the general meeting of the Scientific Assembly on the evening of Tuesday, and the Sections from the following Wednesday to Friday. A number of foreign visitors will be present, including, from this country, Sir Humphry Rolleston, who is announced to give the opening address at one of the sessions of the Section of Medicine, Mr. H. J. Waring, Dr. Norman Walker, and Dr. A. H. Freeland Barbour, who contributes a lantern-demonstration on the sectional anatomy of labour. Professor Victor Morax, of Paris, is to address the Section of Ophthalmology on the extraction of cataract in glaucoma. Accredited physicians from foreign countries are registered at the session as "invited guests" and enjoy all the privileges of membership. These sessional meetings afford great educational opportunities. This year's delegates will have the opportunity of studying the sanitary revolution which has taken place in the "Crescent City" since 1903. Lying with the prodigious Mississippi at its front and Lake Pontchartrain at its back, New Orleans is, to the extent of one-third at least, at or below the mean level of the lake with another third or so below high-tide level. Prior to 1900 the soil of the city was saturated practically to the surface, and up to 1908 there were no sewers. A complete drainage system, carried out at a cost of 32 million dollars, has now been completed, by which the sewage is pumped into the Mississippi River, where it is immediately carried away in the muddy flow. Effective drainage is provided even under meteorological conditions which include a possible rainfall of 3½ inches in an hour or 9 inches between dawn and sunset. The effects on mortality statistics of this colossal installation have fully justified the outlay. In the decade 1880–89 the death-rate from malaria was 156 per 100,000, and from typhoid 21; last year these figures stood at 4 and 13 respectively; the death-rate from all causes having fallen in the same period from 28·6 to 18·2. Some of the credit may be attributed to the treatment of the water-supply by a new continuous process, the raw water from the river passing first through a grit chamber, being then mixed with the appropriate quantity of ferrous sulphate and milk of lime, thereafter sedimented, and finally sterilised by chlorination. Other recent improvements, such as almost complete rat-proofing of buildings, will conduce to make the stay of the delegates pleasant, especially as the mean temperature to be expected during the congress is 66° F. The special train with sleeping cars bringing delegates from Chicago will be parked

so as to allow of the cars being used as sleeping quarters. The s.s. *Comas* of the Morgan line will make a special trip from New York to the Gulf of Mexico on April 21st. Other organisations such as the Air Service Medical Association of U.S., the American Radium Society, the Association of Military Surgeons of U.S., and the Medical Veterans of the World War will take the opportunity of meeting during the assembly. The extensive commercial exhibit, arranged by Mr. Will C. Braun, of 535, North Dearborn-street, Chicago, will be in the Josephine Hutchinson Memorial Building. A carnival ball, a fête champêtre, and a tournament of the American Medical Golf Association complete the attractions, which will be added to by the beauties of the old French quarter, dating back to the foundation by Bienville in 1718 and the location here of the French Government of Louisiana. The New Orleans School of Medicine was started in 1834, and the Tulane Hospital of the University likes to be reminded of the fact that it was in 1917 the first base hospital in the Southern States to be fully organised.

THE TREATMENT OF BILHARZIA DISEASE.

IN his paper on the Treatment of Bilharzia Disease with Tartar Emetic in South Africa, which appears in our present issue, Dr. F. G. Cawston confirms the work already done by J. B. Christopherson[1] in Egypt and by G. C. Low and H. B. G. Newham[2] in London on this important subject. His work was embodied in the Streatfeild Lecture, delivered under the auspices of the Streatfeild Research Scholarship, a recent foundation at the Royal Colleges of Physicians and Surgeons. His results bear out the beneficial results obtained by the authors just mentioned, and it would now seem as if antimony was a real specific for such infections. It is questionable, however, if the doses given by Cawston are large enough, some of his cases only receiving a total quantity of 9 or 10 gr. of tartar emetic in all. Christopherson and Low, on the other hand, believe that at least 20 gr., if not 30 gr., should be the total maximum dose, and their carefully recorded results would tend to show that such a dosage is the correct one. In Cawston's conclusions he states that a dose of 1½ gr. is sufficiently large to administer to any patient at one dose, but there is no reason why 2 or 2½ gr. even should not be given to any healthy adult. The authorities mentioned begin usually with ½ gr. for the first dose and then raise the quantity gradually up to 2½ gr., noting carefully any signs of idiosyncrasy that may occur. Cawston's idea that the rise of temperature which so often occurs after antimony injections is due to sepsis or exposure to cold will not hold. We hope that people who give such injections are too careful to introduce sepsis, and rigors may follow even though the patient is lying in a warm bed. It is more probable that the reaction is due to something in the distilled water, because if this is freshly distilled before each injection such rises of temperature are much less frequent. Other common symptoms, such as cough, tightness in the chest, vomiting, and a tendency to syncope, have also been met with by Cawston, and to prevent these he suggests giving codeia before the injections. Skin rashes are far from common, and the fact of blisters occurring along the line of the vein looks as if there had been a leakage of the salt into the tissues. It would be interesting if the after-histories of these South African cases could be followed up. In an endemic zone the chances of reinfection must always be remembered, of course, but Low and Newham's English-treated cases have all remained cured with no signs of any relapse.

[1] THE LANCET, 1919, i., 1021. [2] THE LANCET, 1919, ii., 633.

THE TREATMENT AND CARE OF SANE EPILEPTIC CHILDREN.

NO therapeutic problem is calculated to awaken greater interest in its successful solution than that of the treatment of the epilepsies. One reason why this treatment has scarcely progressed beyond the symptomatic stage is ignorance of the actual pathogenesis of the condition no less than of the identity or otherwise of the idiopathic and secondary varieties. On the one hand there is the clear case of cortical irritation from organic disease, of Jacksonian epilepsy from tumours, wounds, or vascular disease of the motor area; but difficulties at once commence with the occurrence of generalised epileptic attacks from frontal, parietal, temporal, or occipital wounds indifferently, suggesting that the stability of the cortex is somehow lowered as a whole by a lesion in any part of its extent. When, however, the numerous cases of cerebral trauma free of any epileptic disturbance are borne in mind, we are reduced to the supposition of some predisposing factor for the epileptic cases and find ourselves once more in the futile realm of conjecture. Serious attempts have been made to raise into importance a psychogenic element, more particularly in war epilepsy, and there can be no doubt not only that genuine epileptiform attacks may have their origin in a disordered psyche, but also that treatment along psychological lines may command success.

Notwithstanding the assertions of the psychological extremist such cases are far indeed from filling the whole bill; they constitute only a small minority, how small may be gauged when we bear in mind the epilepsies of uræmia and eclampsia, of alcohol and neurosyphilis, of vascular disease such as the Stokes-Adam syndrome, and when we consider more particularly the epilepsy of infants and children. Variety of causation militates against acceptance of any unifying theory of the disease, but, unfortunately, it renders equally remote the possibility of any discovery of a specific for its treatment, so that the selection of a suitable environment and the adoption of a suitable nerve sedative too often represent the therapeutic endeavour. What can be accomplished has been outlined in a brochure[1] by Dr. J. Tylor Fox, who has been for some 18 months medical superintendent of the colony at Lingfield. His impressions and observations are based on the examination of some 167 patients not yet past their sixteenth birthday. He begins by emphasising the unsuitability of the majority of English homes for epileptic children whose abnormality constitutes a bar to their association with other children, when the tendency grows to keep them more and more within doors. They are not wanted at church, chapel, or Sunday school, at picture shows or other entertainments. Besides, the parents often manifest signs of mental instability. On the other hand, the accepted essentials of the colony are an outdoor life, open windows, daily bath, and a suitable diet. The facts that the fits are ordinary occurrences and

[1] The Care of Sane Epileptic Children. By J. Tylor Fox, M.A., M.D. London: Bale and Sons. 1920. Pp. 40. Price 1s. 6d.

call for no special comment, while the teachers, nurses, and attendants in the institution strive to combine a firm discipline with sympathetic understanding, are positive advantages outweighing the staple objection to the system that it eliminates the idea of family relationships and intimacy from the child's life.

Dr. Fox discusses fully the question of drug treatment. It has been claimed that any good bromide may do by controlling fits is more than balanced by the harm it does in other directions, and that it exercises a harmful effect upon the higher mental functions, but such strictures are probably based on the administration of immoderate doses. The old idea of pushing bromide until the fit habit is broken is not justifiable in view of the fact that arrest of the fits does not exclude the possibility of their reappearance. It may not always be desirable to repress epileptic discharges. Dr. Fox is satisfied there is a small but definite class of epileptic patients who become depressed and irritable for hours or days before a fit, and in whom a major attack "clears the air," and he believes the sound treatment in such cases is to reduce or withdraw whatever routine dose the patient is already taking. His general conclusion is that bromide medication is not by any means the most important factor in the treatment of epileptics on a colony, though the greater number of his cases receive on the average about 20 gr. daily. If bromide is going to lessen or arrest fits it will do so in a few weeks, and if it has not done so in some months the drug may gradually be withdrawn without ill-effect. Borax, as judged by the records of some 69 cases, certainly tends to reduce the frequency of fits, a reduction the more remarkable as in very many cases the drug was given at a time when the attacks were increasing in number. Belladonna and digitalis do not appear to exert any useful influence on fit-incidence, nor do strychnine and calcium lactate. Dr. Fox supplies tables containing valuable information of the general effect of colony life on fits and on mental development. We take pleasure in recommending the pamphlet to all who are concerned with the treatment of epilepsy.

SIMULATION AMONG PRISONERS OF WAR.

Commenting on Professor Pellegrini's article on this subject, which recently received notice in THE LANCET,[1] Dr. Luigi Castaldi,[2] of Florence, gives an interesting account of simulation as practised by Italian officers interned in Austria-Hungary. He points out that the principal difference between simulation in Austro-Hungarian and German camps was due to the fact that while in Germany the only advantage which the successful simulator could obtain was to be transferred to hospital, in Austria-Hungary he had a good prospect of repatriation. This was the reason why cases of simulation in German prison camps were only sporadic, whereas in Austria-Hungary the practice was extremely prevalent. Dr. Castaldi does not hesitate to affirm that 80 to 90 per cent. of the officers who were repatriated from the camps in Austria-Hungary were simulators, only a very small minority having really severe wounds or tuberculosis. Among the private soldiers, on the other hand, with whom tuberculosis and malnutrition were very rife and the mortality very high, simulation was rare, and the great majority of those repatriated were really seriously ill. It was noteworthy that while the diseases simulated in Germany, according to Pellegrini, were all mild, transient, and acute, such as jaundice, œdema, and pseudo-elephantiasis, in Austro-Hungary those diseases were simulated which produced a more or less permanent disability, such as tuberculosis, atrophy of a limb, neurasthenia, and mental disease. Simulation of tuberculosis was effected in various ways—e.g., by injection of air into the skin of the supra-clavicular region so as to give rise to a tympanitic note and crepitations on auscultation, prolonged fasting, and the use of certain drugs, such as thyroid extract in large doses and purgatives, to produce emaciation, ingestion of large doses of iodide of potassium to make the vesicular breathing rough at the apices, smoking of cigarettes containing sulphur, cotton, or straw to produce râles, and the substitution of the sputum of an actually tuberculous patient for which a large sum was often paid. In a few instances diabetes or nephritis was simulated by introduction of glucose or albumin into the bladder or merely into the meatus or beneath the foreskin. Although the simulators were willing to undergo a considerable amount of discomfort to secure their purpose, Dr. Castaldi did not see or hear of any case of suicide or auto-mutilation.

[1] THE LANCET, Dec. 27th, 1919, p. 1201.
[2] Gazzetta degli Ospedali e delle Cliniche, Feb. 15th, 1920.

COÖRDINATION OF RESEARCH AT THE MIDDLESEX HOSPITAL.

IT is in our opinion a wise proposal on the part of the authorities of the Middlesex Hospital to amalgamate the Cancer Research Department and the Bland-Sutton Institute of Pathology with the Medical School. The object of the proposal, which has just been considered by the Court of Governors, is to bring the various departments concerned in research, both in regard to cancer and other medical problems, into closer coöperation so as to avoid anything like overlapping, and to economise in regard to staff and laboratory accommodation. Closer coördination between those working at these problems would thus be insured. Even within the walls of a single institution it is possible for waste of effort to occur unless some such scheme is carefully worked out. Another advantage which is likely to accrue is that closer relations will be set up between the clinical and the laboratory aspects of the work of the hospital, which should be fruitful in two ways; research would be well directed, and the scientific results would be applicable to the actual diagnosis and treatment of disease, especially of cancer, for which this hospital offers such a valuable field. The recent establishment of university chairs in pathology, physiology, physics, and radiology at this institution should give a great impetus to the application of these branches of pure science to medical problems, especially under the conditions suggested in the new proposals.

AN EXTENDED SCHOOL MEDICAL SERVICE.

A white book,[1] recently issued by the Board of Education, applies to the whole public educational service arrangements similar to those already existing under the more progressive authorities. The extension of the compulsory limit of education

[1] The Consolidated Regulations of the Board of Education for Special Services Relating to the Healthy Development of Children (Cmd. 617).

beyond the age of 14 years, a change involved in the Fisher Bill of 1918, made this step inevitable. All secondary, continuation, and special schools are now included in the scheme. The minimum age of admission to special schools is reduced from 5 years to 2. Under this heading the deaf-mute will benefit most, as the earlier he is taken in hand the better. With this exception it is to be hoped that local authorities will get sufficient nursery schools going for healthy children before tackling special schools at this age, when it will be found that the blind and otherwise physically defective child will fare very well in the ordinary nursery school. The infinitesimal numbers in the small area covered by a nursery school do not warrant a special school, nor is institutional life for these youngsters advisable; their presence also would educate the healthy child in sympathy and tolerance. Rural authorities will still look in vain for guidance in the regulations which are being framed entirely for urban areas, where problems have quite a different complexion. They specially need help in deciding how the mentally defective and cripple children in scattered areas are to be collected and taught. The possibility of a continuous medical record for the school child is brought nearer by the regulations. The ideal to be aimed at is a dossier for each child, a single card accompanying it from the nursery to the elementary school and from there to the secondary or continuation school. We hope that the process of boiling down the multifarious documents at present relating to one child may not devolve upon the unfortunate school medical officer, already overburdened by schedules and cards. Too many routine inspections make it impossible for him to become properly acquainted with the general hygienic conditions of the schools in which he and the children spend so much of their lives, and in which, if time allowed, he could carry on inquiries of lasting value to educational life. As things are, he is generally a whole-time worker condemned to a dull routine in order to compile the tables demanded by the Board of Education.

MEDICAL RESEARCH IN INDIA.

IT is probable that few people outside the Indian Medical Service are aware of the treatment that scientific medical investigators have received in the past from the high officials on whom favour or fortune has placed the responsibility for governing India. Fortunately, at the present moment matters have reached a far more satisfactory point, and the value of medical research is now admitted by many administrators in India. Formerly discouragements of all kinds were placed in the way of the investigator, and many valuable researches have been carried out at the worker's own expense, and in spite of official obstacles purposely placed in his way. In the recently issued special number of the *Indian Journal of Medical Research*, containing the papers and addresses read before the Sixth Annual Indian Science Congress, held at Bombay last year, two instances were mentioned which illustrate to some extent the official attitude of the past towards medical research in India.

The first of these was given by Lieutenant-Colonel Sir Leonard Rogers, I.M.S., President of the Congress, in his opening address. He relates how Mr. N. C. Macnamara, I.M.S. (there were no military titles in those days), had been engaged for a number of years in a special study of cholera in India, particularly in Calcutta; how he had published his views, quite novel at the time, that this disease was spread by water contaminated with the stools of cholera patients; and how also he had clearly indicated that the causative organism would be found in the evacuations of the sick. Some time later, while at home on leave, he studied the then young science of bacteriology, *at his own expense*, with a view to further investigations on cholera when he returned to India. Having thus qualified himself to undertake the search for the specific organism of cholera, he applied to the India Office for facilities to pursue his investigations on his return to duty. It is almost incredible, but nevertheless the fact, that the India Office absolutely refused to give him the required facilities, although within a year they granted them and other privileges as well to a German bacteriologist who wished to make a special investigation of cholera in India. This German bacteriologist in the meantime discovered the cholera vibrio while working in Egypt. If Macnamara had been given the facilities when he asked for them it is almost certain that he would have isolated the cholera organism. This instance, Sir Leonard Rogers remarked, was typical of the way in which scientific investigators in India were treated not so very long ago. Mr. Macnamara, who died at the close of last year at the advanced age of 86, retired from the Indian Medical Service in 1876, was elected to the staff of the Westminster Hospital, and became Vice-President of the Royal College of Surgeons of England.

The second instance, a personal one, was related by Lieutenant-Colonel W. Glen Liston, I.M.S., in his address as President of the Medical Research Section of the Bombay Congress. It was to the effect that shortly after joining the Indian Medical Service he became deeply impressed as to the connexion of insects with certain diseases, and in consequence he studied entomology. Later he was transferred to a very malarious station in medical charge of a regiment and a small civil surgeoncy. Continuing his entomological studies there, he discovered a number of new species of anophelines, investigating their habits and locating their breeding-places. This information he embodied in an official report in which he made recommendations for the destruction of the malaria-carrying mosquitoes and for "training" the river which passed through the cantonment. He also suggested that a part of the local hospital should be protected against access of these insects by wire gauze to prevent them biting malaria patients and thus spreading the disease. To his surprise and chagrin, no notice at all was taken of his report, and it was not until a long time afterwards, when he met the principal medical officer, that he asked him as to the fate of the aforesaid report. He was told that, as his proposals were too costly to be accepted, the report had been ignored altogether. He was also informed that when the P.M.O.'s head clerk inquired what he was to do with the report the answer was "file it," which was tantamount to burying it for ever. Thus an opportunity for converting an unhealthy station into a healthy one was lost, and some risk was run of the Indian Medical Service losing a competent investigator, who, after the chilling reception of his first report, might have relinquished scientific investigation for some more popular and remunerative branch of medicine. Fortunately, in this instance no great harm was done in this direction, for Colonel Glen Liston stuck manfully to scientific research, and subsequently it was largely through his experimental investigations that the ætiology of bubonic plague was placed on an unassailable basis.

Happily, as has been said already, medical research in India is now more appreciated; the neglect of the past is being remedied. At the present time there are at least six medical institutes for scientific research in one or another part of India manned by members of the Indian Medical Service. Two schools of tropical medicine are being developed, one in Calcutta and the other in Bombay. The Indian Government has established a fund for medical research, which has already

financed a number of investigations which otherwise could not have been carried out. The present, then, may be regarded as offering to research workers favourable opportunities in India for solving some of the important problems which have been awaiting solution. Medical research in India may now be said to be on the upgrade after many years of discouragement.

ASYLUMS MEDICAL STAFF.

THE Board of Control, in a circular (No. 560), dated March 3rd, addressed to the visiting committees of county and borough asylums, suggests many improvements in the status of the asylums medical service. Increased salaries, along with liberty to marry and to live outside the ring-fence, are designed to make the lot of the medical officer a happier one, while restriction in the number of recent cases under his individual care and the granting of study-leave are to increase the efficiency of his work and his interest in it. If the welfare, treatment, and recovery of patients is not to be jeopardised, and the study of mental diseases is not to lag behind that of other branches of medicine, the Board of Control urges upon asylum committees the need of initiating measures to maintain progress, and offers to confer with them as to the best lines of carrying the measures through.

THE MEDICAL AND DENTAL REGISTERS.

THE total number of names on the Medical Register on the last day of the year 1919 was 44,522, being 596 more than a twelvemonth previously. 1322 names were added by registration during the year, 34 were restored, and 760 removed, 643 on evidence of death. We miss a record of the proportion of men and women practitioners, which would be of general interest. 1500 names appear in the Colonial List and 165 names in the Foreign List. The professional colleges of Alberta and the North-West Territories of Canada now figure among the bodies granting degrees registrable in this country. The Dentists' Register contains 5455 names, being 112 fewer than a year ago, and only a bare 315 more than in the year 1913. Among the qualifications entitling certain colonial and foreign dentists to enrolment appear for the first time the D.D.S. of Dalhousie and of Laval (curiously mis-spelled Naval) University, the L.D.S. of the Royal College of Dental Surgeons of Ontario, and the Royal Swedish Dental Diploma. The Medical and Dental Students' Register contains the names of 3420 medical students enrolled during the year 1919: 1375 in England, 1387 in Scotland, and 658 in Ireland. Comparable figures for 1913, the last pre-war year, were 650 + 536 + 294 = 1480. The entries of dental students for the years 1913 and 1919 are 361 and 612 respectively. It should be noted, however, that from 1916–18 the dental entry barely exceeded an average of 150 a year. Taken as a whole an inspection of these registers assures a sufficiency of recruits to the medical and dental professions, but for the nonce the shortage of registered dentists remains unrelieved.

THERE are 155,729 persons on the books of the Bristol Insurance Committee.

ARRANGEMENTS have been made for applying the Schick test and actively immunising against diphtheria the susceptible children in 100 public schools of New York City.

IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

Remuneration for Public Medical Services.

A LARGELY attended meeting of the Poor-law medical officers of the north-western counties was held recently at Clones, county Monaghan, at which several resolutions dealing with the remuneration for certain public services were unanimously passed. In the first place, the meeting reiterated the demands of the Irish Medical Committee regarding the minimum salaries that should be accepted for Poor-law appointments and for Poor-law locum-tenens duty. A further resolution dealt with a subject to which, up to the present, medical men have paid too little attention—the salaries paid to Poor-law medical officers in their capacity as medical officers of health. These salaries have hitherto been so small as to be almost negligible: they range from £5 to £25 a year, the average being about £15. It is now demanded that the minimum salary for rural districts should be £50 and for urban districts £75. Poor-law medical officers, by virtue of their office, are entitled to the office of registrar of births, deaths, and marriages. The emoluments are trifling and in many cases medical officers have thrown up these appointments. The Clones meeting demanded a uniform fee of 2*s*. 6*d*. per entry. A more important, and an entirely just, demand is that the State should pay a fee of 5*s*. for each death certificate issued by a medical man. It is out of all reason that this important work should be thrown on the shoulders of the profession without remuneration.

Tuberculosis Sanatoriums for Belfast and District.

At an adjourned meeting of the City Council of Belfast, held recently, it was reported that, in response to a request by the Tuberculosis Committee, the Ulster Medical Society and the Ulster Branch of the British Medical Association, Mr. A. Fullerton, Mr. Grimble, and Mr. T. S. Kirk had conferred with Sir Henry Gauvain, in reference to the proposal to develop Graymount as a sanatorium for the treatment of osseous tuberculosis of children. While agreeing that the establishment of such a sanatorium was necessary, they considered that a more suitable site should be procured outside the valley of the Lagan, on the county Down side of that river, which runs through the city of Belfast. In the meantime, until Sir Henry Gauvain reports, the whole matter is in abeyance, public opinion being decidedly against Graymount as a site. Another recommendation was to extend the accommodation of the Whiteabbey Sanatorium for Pulmonary Tuberculosis, which was strongly opposed by Dr. J. D. Williamson, chairman of the Public Health Committee. The cost of this extension, he said, would be anything from £15,000 to £20,000, and, he asked, had there been a commensurate amount of good accomplished for the money spent on tuberculosis in Belfast? His advice was to purchase land outside the Lagan Valley on which to erect a sanatorium worthy of the city of Belfast and not to spend more money on adding to the sanatorium at Whiteabbey, where, he added, "everyone knew that cases of acute pulmonary tuberculosis had not a fair chance of recovery." He would not scrap Whiteabbey Sanatorium, but he would use it for advanced cases of pulmonary tuberculosis—as a home for the dying. The council, however, adopted the recommendation authorising the Tuberculosis Committee to take the necessary steps for the preparation of plans and estimates for the Whiteabbey Sanatorium extension.

The Down County Council have purchased a house and grounds on the east side of Belfast Lough called Craigavon, about three miles from the centre of the city of Belfast, for a consumption sanatorium. Against this action the local residents are loudly protesting, and at the half-yearly meeting of the Castlereagh rural council all the members expressed themselves as strongly opposed to the county council's proposal to take Craigavon on the ground that the site was low-lying and unsuitable, and that, throughout county

Down, there were higher levels that would be of greater advantage. An inquiry into the question is being held, and the Castlereagh rural council instructed their solicitor, with a deputation from that body, to appear at the inquiry and to oppose the proposal of the Down County Council. In one of the Belfast papers Mrs. Green, the widow of Mr. Forster Green, who established the "Forster Green Hospital for Consumption," states that many years ago, when her husband considered the suitability of several places for a tuberculosis sanatorium—even as far back as 30 years ago—Fortbreda, high and sheltered, was felt to be infinitely better than any site near the shores of Belfast Lough. She entirely agrees with those who say that either side of Belfast Lough is unsuitable for a tuberculosis sanatorium.

A City Bacteriologist.

The City of Belfast Municipal Council have decided that, pending the erection of a municipal laboratory, arrangements shall be made for carrying on the general bacteriological work of the corporation in the Central Tuberculosis Institute, and that a qualified bacteriologist, to devote his whole time to the duties of the office, shall be appointed. The proposed salary is £700 a year, rising by £50 increments to £900, and a whole-time laboratory attendant is to receive £250 a year. It was also recommended that Professor St. Clair Symmers, whose appointment as bacteriologist expired on March 31st, should be retained in that position for a further term of one year at a salary of £350.

April 12th.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

The First Recorded Case of Aleppo Boil in France.

M. Ravaut has reported to the Academy of Medicine a case of Aleppo boil contracted in France. It occurred in the Pyrenean district in a young girl who had never been out of France. She had been subject to bites by mosquitoes every summer, and two of the bites were followed by nodules, one on the nose and one under the right eye. The lesions had been present for a year and had resisted all treatment. Clinical diagnosis was almost impossible, as neither the induration nor the classical furunculosis was present. Microscopic examination, however, showed by the presence of innumerable Leishman's bodies that the nodule was an oriental sore. Treatment by novarsenobenzol was immediately followed by shrinkage of the lesions. The case is interesting since it is the first reported proof of the propagation of this infection in France; the germ must have been introduced by the Kabyles or by colonials working in the vineyards of the district. Other cases will almost certainly be discovered if a systematic search is undertaken; examinations should be made on small portions of tissue crushed between two slides and not on the serous secretion.

The Eight-hour Day and Hospital Staffs.

Physicians and surgeons are complaining that the institution of the eight-hour day among hospital staffs has totally upset the nursing, and on behalf of their colleagues MM. Cuneo and Sergent have made a protest on this subject to M. Mesurier, director of the Assistance Publique in Paris and of the supervisory council of this administration. The rounds of the honorary staff are usually made from 9 A.M. The change of shift following shortly after their visit results in the treatment being given by nurses who, not having been in attendance on the round, cannot carry it out as efficiently as if they had themselves heard the precise details ordered by the chief. To quote the protest of MM. Cuneo and Sergent "the change of personnel produced by the law of an eight-hour day is very prejudicial to the patients; it would seem as though the law should never have been applied to hospital staffs." Questioned on this subject, M. Mesurier said that it was impossible to discuss the eight-hour day, which is applicable to all municipal employees and consequently to the hospital staffs, who could not be treated differently. The way to avoid the danger emphasised in the memorandum of MM. Cuneo and Sergent is to change the method of application of the law and to make it accord with the interests of the patients. M. Mesurier promised to give the reform his immediate consideration and has no doubt that a new adjustment of the rules will give satisfaction to all parties. This controversy having been published in the press, the union of hospital attendants has issued a protest, in which it accuses the doctors of not having made efforts to adapt themselves to the consequences of the law and of beginning their rounds too late. It is alleged that some of them do not arrive at hospital till 11 o'clock, after having disposed of their private patients. When these clinicians have seen some 100 patients between 11 and 12, the shift which has been on duty since 6 A.M. has no time to complete the treatment and dressings ordered before going off duty, and these are left to the next shift, which has, perforce, to receive its instructions at second-hand. This statement on the part of the hospital staffs seems much exaggerated, and it is only the exceptional cases which have been quoted by them. In practice, when the visiting doctor arrives late, his assistants have already examined the patients and have prescribed for most of them so as to have to refer to their chief for a decision only on new or serious cases. Besides, all the dressings are done in the hospitals by the assistants themselves, not by attendants or nurses.

The Campaign against Cancer.

M. Le Troquer has made a proposal to the Municipal Council of Paris, designed to develop the fight against cancer, which is still on the increase. While in 1910 3073 cases were notified by doctors, last year there were 3619. Nevertheless, M. Le Troquer estimates that, according to results already obtained by numerous scientists, the certain cure of cancer will be realised in the near future by means of radium. Unfortunately radiotherapy has hitherto been confined to the private practice of a few specialists, mainly resident in Paris. Apart from these, there are other medical men—certainly becoming more numerous—who possess of this precious substance a fragment so small as to have little therapeutic value. Obviously, at 800,000 francs a gramme radium is not available for many purses. The Assistance Publique is not in a position to afford this special treatment to the poor. Dr. Regaud and one of his colleagues in the Pasteur laboratories are the only ones who have begun to treat cancer patients in Paris hospitals by radium. In other countries, on the contrary, radiotherapy has developed considerably. For this reason M. Le Troquer asks for the institution of an autonomous hospital dispensary, in connexion with the Radium Institute of the University of Paris, which shall have the possession of 2½ grammes of radium, bought by means of a loan of 2½ million francs, for which M. Le Troquer also appeals. The hospital would be constructed near Paris on a site now available owing to the demolition of fortifications.

April 10th.

BUDAPEST.

(FROM OUR OWN CORRESPONDENT.)

Effect of Altitude on the Blood.

Dr. Voicu, a Roumanian pilot, formerly a medical practitioner, has been studying the effects of a high altitude on the blood, and for this purpose has analysed the amount of iron contained in the organs of soldiers and animals in the highest parts of the Carpathian mountains, as compared with control men and animals. Even after a short stay in the mountains a decided reaction is noticed, since liver and blood and spleen become rich in iron. The explanation is probably that reserve depôts are opened and more hæmoglobin is passed into the blood; since this is used up more rapidly more iron is deposited in the liver. After the second or third week the hæmopoietic apparatus ceases its over-production and the liver gives up its iron to the blood. As a result the iron content of the blood

gradually increases, while that of the liver first rises and then falls. This observation is in perfect accord with the result of blood counts made on pilot pupils, who during instruction time are spending, so to say, several months in the air at heights equal to high altitudes. The chief stimulant is probably the rarefied air, but it is likely that radio-activity, which is present to a marked degree in the mountains, plays a prominent part.

The Toxicity of Cresols.

In the absence of modern and up-to-date disinfectants recourse is had to cresols, which are widely used here instead of the modern lysoform preparations. Dr. Vámossy examined the effects on a number of animals (cats, rabbits, mice, frogs) of the three isomeric cresols, and found that all the three behaved differently. Paracresol is decidedly more poisonous than carbolic acid for both carnivorous and herbivorous warm-blooded animals; orthocresol is equal in toxicity to carbolic acid, as described by Dr. Tollens in 1901, but metacresol is less toxic. A number of crude and saponified samples of cresol on the market were also examined. Contrary to the usual statements, they gave rise to the same symptoms in about the same dosage as carbolic acid and some of the crude samples proved even more toxic. The presence of soap does not seem to diminish the intensity of action, and the same is true for carbolic acid, since the latter, plus soap, introduced into the stomach of an animal, kills just as rapidly as carbolic acid alone.

The Practice of Medicine in Albania.

Dr. Vulcan practised during the last four years of the war in the Mohammedan part of Albania and recently stated before the Medical Society of Nagy-Szeben that practice in Albania is attended with great difficulties in consequence of social and religious customs. These, with the dense ignorance and extreme poverty of the mass of the people, are responsible for the widespread epidemics which prevail and which have baffled all the efforts of the Austro-Hungarian Government for their suppression. There is no scientific system of native medicine. Herb doctors, known as "hodzsas," combine with their medical practice the use of charms and incantations, with offerings to the gods. Superstitions and astrology are credited and much practised. Surgery is in the hands of unskilled barbers. The condition of women is particularly deplorable. Even the daughters and wives of the so-called cultured classes can never see a male physician, but must be treated through the medium of ignorant midwives. The intermarriage of near relatives and child marriages are an unfailing source of evil. Girls of 12 to 13 years are known to become mothers. Of course, an increasing population under these physical conditions cannot be a healthy and vigorous one. The mortality is great in consequence of the grinding poverty and bad housing. The nutrition is very poor; pork fat is not used, herbaceous oils alone being allowed. The hospitals established of late years may perhaps improve the high mortality rate.

Poisoning with Methyl Alcohol.

Owing to the high price of pure refined alcohol unscrupulous brandy-dealers have recently sold methyl alcohol, with the result that several of the consumers have died, or have suffered from severe nervous disorders, particularly optic neuritis. In this connexion Dr. Pollak recently gave an address on the comparative toxicity of alcohols. He said that all the alcohols of the methyl series are toxic, but in an ascending scale from methyl alcohol to amyl. Methyl alcohol, or wood-alcohol, as it is called here, is cumulative in its effect; the others are not. This seems to be due to the fact that one of the most important effects of methyl alcohol is a great retardation of oxidisation. Methyl alcohol remains more or less unchanged when in contact with the tissues, and as a consequence continues to exert its influence. According to some authorities methyl alcohol partly metabolises into formaldehyde and formic acid, which would account for its toxic effects. In recent years, owing to the making of odourless wood-alcohol, there has been much more abuse than has come to light. Some cases have even been reported in which pharmacists have used it in tinctures. It is surprising, said Dr. Pollak, that more peripheral neuritis has not been reported from its use. It seems probable, however, that death comes so soon that peripheral neuritis has not time to develop. It acts specially on the ganglion cells of the retina, but also on other important cells of the central nervous system.

Nagyvárad, March 24th.

TUBERCULOSIS.

Tuberculosis as a Factor in Depopulation.

A RECENT number of the *Paris Médical* gives an interesting abstract by Dr. Perrin, professor in the Faculty of Medicine at Nancy, of an investigation made by him years ago into the influence of a tuberculous stock on the upward or downward trend of population. Dr. Perrin, in the course of his duties at the hospital at Nancy, made inquiry into the histories of 1000 families, all of the working classes. Of these families, 500 had one or other parent tuberculous, while in each of the other 500 families both parents were free from tuberculosis, the visit to the hospital being on account of non-tuberculous disease. The families were in no other way selected, and were a consecutive series in their attendance at the hospital. Dr. Perrin further states that in their environment, habitations, overcrowding, exposure to infectious disease, alcoholism, venereal disease, and gastro-enteritis, and also in their years of married life, the two groups were exactly comparable. At the same time it must be pointed out that their economic circumstances would require very careful investigation before their similarity can be unreservedly accepted; on this Dr. Perrin's summary in the journal in question does not throw sufficient light.

The first point deduced from Dr. Perrin's data is that, whatever the reason may be, the non-tuberculous group is markedly more prolific than the tuberculous group. Then, not only are the children of the non-tuberculous more abundant, they are also less vulnerable to disease in general, and less affected by tuberculosis in particular. The proportion of healthy children among the non-tuberculous families was double that among the tuberculous. The difference was, in fact, such that a population consisting of households infected with tuberculosis would tend steadily to diminish, while a population composed entirely of healthy non-tuberculous families would tend to double itself from one generation to the next. In all this there is, of course, no valid argument for the policy of leaving the extirpation of the disease to natural laws. Assuming the accuracy of Dr. Perrin's standards for the comparison between the two sets of families, there is nothing but encouragement to the social worker in the view that his human effort towards the elimination of tuberculosis is in the same direction as, and not opposed to, the natural history of the disease itself. These data are an indication of the need for caution in associating a downward curve in the mortality from tuberculosis with particular preventive or curative measures.

The Effect of Tuberculosis on the Length of Life.

In the *Statistical Bulletin* of the Metropolitan Life Insurance Company for February a report is published of the effect of tuberculosis on the length of life of industrial policy-holders. The disease reduces the expectation of life of white males by nearly three and a half, and of coloured males by approximately five years. Under the prevailing rates of tuberculosis mortality, the expectation of life of the industrial white male at birth is 46 years, and of the coloured male only 37 years. It is calculated that the eradication of tuberculosis would add as much to the life-span as has resulted from all the sanitary improvements of the last 25 years. The tuberculosis mortality among wage-earners in 1919 shows a favourable decline, equivalent to a drop of 33 per cent. below the figure for 1911. This achievement is attributed to public health and educational work during the past 30 years and to the intensive

health conservation work of this company on behalf of its policy-holders. It is also interesting to note that, in the experience of this company, the influenza of 1918 had little effect on the incidence of tuberculosis.

Friedmann's Turtle Vaccine.

The committee officially appointed to investigate the value of Friedmann's remedy has already sat four times. At the first sitting the measures necessary for a thorough investigation of the remedy were discussed. Professor Friedmann attended the second sitting, and at the end of the third sitting he had consented to submitting his remedy to various tests. At the fourth sitting, which was presided over by Professor Uhlenhuth, subcommittees were appointed, one with the task of experimental biological investigations, another with that of clinical investigations, medical and surgical. A committee was also appointed to sift the literature of the subject and to collect hitherto unpublished records. Many well-known names appear on the main committee, including those of Professor Kraus of Berlin, Professor Kruse of Leipzig, and Professor Braun. In a letter to the *Münchener medizinische Wochenschrift* for March 12th, Professor Friedmann, referring to the liberation of his remedy for wholesale testing, appeals to his colleagues to follow strictly his indications and technique, and to fill in certain forms to be forwarded to Berlin with a view to subsequent statistical analyses.

The Campaign against Tuberculosis in Canada.

The province of Quebec is about to embark on an active campaign to eradicate tuberculosis. As elsewhere, Quebec is realising that tuberculosis causes the most striking of all losses of productive population. Toward this end the Superior Board of Health of Quebec has recently appointed a special committee of four medical men competent in public health work. Dr. J. A. Beaudouin is to act as secretary of this committee, the other members of which are Drs. J. E. Laberge, R. Paquin, and E. M. Desaulniers. They will make an exhaustive study of the problem of tuberculosis in the province before applying the knowledge gained in a province-wide campaign. The Quebec Government and the Federal Government will be asked to assist, and boards of trade, the pulpits, platform, and public press will be swung into line to make the campaign a complete success.

A new sanatorium for the treatment of tuberculosis cases is being constructed at Keith in Alberta. The initial capacity is for 175 cases, increasing to 350 when all units are completed.

Annual Reports.

Much of the thirteenth annual report of the *King Edward VII. Sanatorium, Midhurst*, is devoted to bringing up to date the statistical analyses previously published by Dr. N. D. Bardswell. In April, 1919, a highly trained head gardener was appointed to instruct patients in their work. All physically fit for light gardening have shown a remarkable enthusiasm and have gained much useful knowledge. Of the 301 cases analysed, 69 were discharged with the disease arrested, 141 with health much improved, 48 improved, and 43 stationary or worse. Of the 305 throats examined 281 were normal, 24 diseased. The report does not give much information as to modern methods of treatment, such as actino-therapy and lung collapse, but a cheerful account of chicken-farming is added.

The fourteenth annual report of the *Trinidad Association for the Prevention and Treatment of Tuberculosis* contains useful statistical data. During the year 1918 the total number of deaths in the colony (pop. 379,165) from all forms of tuberculosis was 545—an increase of 40 deaths over the mortality of 1917. There was, however, no appreciable rise in the tuberculosis mortality till the last year of the war, and, as a table shows, the death-rate in 1918 was only 1·44 per 1000, as compared with 2·58 in the year 1905–6. This great reduction is regarded as the response to anti-tuberculosis propaganda. Since its establishment in 1905, the association has set itself three chief objectives. Of these, a dispensary for the gratuitous treatment of the disease and an educational campaign have been realised with marked success. But the third objective, a sanatorium for early cases, has not yet materialised. The association is, however, more than ever convinced of its absolute necessity, and an appeal is directed to the Government to help establish a tuberculosis sanatorium in some suitable place in the colony. It is pointed out that stamping out the disease can be effected at infinitely smaller cost than is possible in the United Kingdom. Without State aid it is evident that the tuberculous poor must inevitably provide ever-recurring sources of infection.

Tuberculosis in Foreign Journals.

The *American Review of Tuberculosis* for February opens with a sympathetic obituary notice of Sir William Osler by Dr. S. A. Knoff, who appends a bibliography of Osler's publications relating to tuberculosis. Though this runs nearly into two pages it is probably very incomplete. Dr. J. B. Rogers contributes a paper on Artificial Tuberculous Infection of Guinea-pigs through the Respiratory Route, and Dr. E. H. Funk a paper on Pulmonary Syphilis. The remaining three papers concern various aspects of accidental and artificial pneumothorax.—In the January issue of the same journal new light is thrown on an old subject by Dr. H. Sewall, who discusses the means for sorting out the tuberculous from that large group of patients seeking medical aid for a sense of "ill-defined misery." In conjunction with auscultatory and X ray signs indicative of slight tissue sclerosis about the hilum and upper bronchial radiations, the author has found blood-pressure measurements of inestimable value. The existence of occult tuberculosis is suggested when there is an abnormal lowering of the blood pressure, and when this lowering is progressive, on change from the supine to the erect posture. The author distinguishes between occult and incipient, clinical pulmonary tuberculosis, associating the blood pressure phenomena described with the former only. Though hypotension may also be a feature of incipient clinical pulmonary tuberculosis, it is not characterised by a critical lowering of the blood pressure in the erect posture. In a paper on Complement Fixation, Dr. S. A. Petroff finds that this test in tuberculosis is more specific than the Wassermann test, but it is only one of the many links in the diagnostic chain. And it is a delicate link; to be reliable the test must be carried out by well-trained workers. Dr. Lawrason Brown and Dr. Homer L. Sampson contribute a valuable paper on the Early X Ray Diagnosis of Ulcerative Tuberculous Colitis. They have come to the conclusion that tuberculous colitis occurs far more frequently than is generally supposed to be the case, and that in the early stages the clinical picture may be of little aid in diagnosis. But if the X rays show hypermotility and spasm, or filling defects, and pulmonary tuberculosis exists, then tuberculosis of the colon also may be diagnosed with certainty. Illustrative of the high standard of the Trudeau Sanatorium are the authors' final remarks: "No examination of a patient with pulmonary tuberculosis can be considered complete to-day without a roentgenological study of the intestines."

The first four articles in the *Wiener klinische Wochenscrift* for Jan. 8th deal with tuberculosis. In the first, Dr. M. Hayek, of Innsbruck, discusses the principles of actino-therapy in pulmonary tuberculosis and their relation to the problems of immunity. The value of this paper lies rather in its collection and discussion of current views than in any new matter it may contain. Following a paper by Dr. A. Engel on the statistics of pulmonary tuberculosis in the war—a dismal review—Dr. O. Orszagh gives an interesting account of the reaction of the subjects of tuberculosis to other infections. His figures show that the more advanced the pulmonary tuberculosis, the less violent is the patient's reaction to intercurrent affections, such as tonsillitis, and to vaccination. The last of these papers on tuberculosis is by Dr. W. v. Schulz, who discusses the examination of tuberculous sputum by the zinc precipitation method.

HOUSING NOTES.

The Economic Rent.

IN an article contributed to the current *Journal of the Royal Sanitary Institute* Mr. J. F. Smillie makes a useful contribution to the discussion of the economic factor in the replacement of slum dwellings. The new houses to be erected under the ægis of the Ministry of Health must conform to a rather high standard of amenity. The criticism constantly heard is that the present dwellers in slumdom will not be able to pay more than a small fraction of the rent of these new houses. Mr. Smillie points out that there are many far less attractive houses at present occupied by members of the artisan class, who are earning good wages. He argues that the new houses will easily be filled from this source, and that the dreary rows of Victorian architecture so deserted will provide an outlet from the slums. The process will resemble that which occurs in a colony of hermit crabs when an unusually large and desirable shell is washed among them by the tide. It is a compromise between the ideal and the practical, which certainly commends itself, and which should work out quite easily by the ordinary law of demand and supply.

The London Building Act.

The limit of height in London buildings was discussed at a meeting of the Royal Institute of British Architects on March 29th. Mr. Delissa Joseph read a paper in which he proposed a modification of the Building Act so as to allow of the erection of buildings up to 200 ft. in height opposite parks, public gardens, open spaces, and the riverside, and buildings equal in height to the width of a street when that width exceeded 80 ft. The proposal was made more attractive by suggesting that various improvements in town-planning might be carried out as a result of the increased value of present sites. The argument, however, is not convincing, even could we be sure that the increased value would come to the public purse. For every high building has more than one aspect, and it is only when its long shadow falls upon unoccupied ground throughout the whole day that the "sky-scraper" can be considered innocuous. There are, perhaps, a few sites on the southern bank of the river and on the south aspect of the larger parks, where such buildings might be erected with advantage to secure for city homes every available glimpse of sunshine, but any alteration in the existing Act must be carefully safeguarded. Under no circumstances must we permit in this country buildings such as have been described by Professor James Ford[1] as "a structure five or six stories high, or perhaps higher, built largely of wood, but with brick exterior, three or four rooms deep, sharing party walls with similar buildings to the right and left, sharing with its neighbours a narrow court or shaft, at the sides and at the rear an ugly yard." Hygiene must be secured, fool-proof lifts installed, and adequate security provided against the danger of fire.

URBAN VITAL STATISTICS.

(Week ended April 3rd, 1920.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18,000,000 persons, the annual rate of mortality, which had steadily increased from 15·6 to 18·7 in the six preceding weeks, fell to 16·7 per 1000. In London, with a population of nearly 4½ million persons, the annual death-rate was 16·3, or 3·0 per 1000 below that recorded in the previous week, while among the remaining towns the rates ranged from 5·7 in Carlisle, 6·3 in Oxford, and 7·8 in Wimbledon, to 27·7 in Blackburn, 29·8 in Wigan, and 43·4 in Dudley. The principal epidemic diseases caused 456 deaths, which corresponded to an annual rate of 1·3 per 1000, and comprised 180 from measles, 123 from whooping-cough, 72 from diphtheria, 63 from infantile diarrhœa, 11 from scarlet fever, 5 from enteric fever, and 2 from small-pox. Measles caused a death-rate of 2·6 in Lincoln, 3·6 in Wigan and in Newport (Mon.), and 5·0 in Barnsley. The 2 deaths from small-pox belonged to Liverpool. The deaths from influenza, which had steadily increased from 66 to 392 in the nine preceding weeks, fell to 379, and included 124 in London, 30 in Birmingham, 21 in West Ham, and 9 each in Manchester and Blackburn. There were 2023 cases of scarlet fever, 1983 of diphtheria, and 20 of small-pox under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 2101, 2043, and 14 respectively at the end of the previous week. The causes of 29 deaths in the 96 towns were uncertified, of which 6 were registered in Birmingham, and 3 each in Liverpool, St. Helens, and Manchester.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2½ million persons, the annual rate of mortality, which had increased from 14·2 to 18·0 in the six preceding weeks, fell to 17·2 per 1000. The 376 deaths in Glasgow corresponded to an annual rate of 17·6 per 1000, and included 22 from measles, 15 from influenza, 3 each from scarlet fever, whooping-cough, and diphtheria, 2 each from small-pox and infantile diarrhœa, and 1 from enteric fever. The 117 deaths in Edinburgh were equal to a rate of 17·9 per 1000, and included 3 from influenza, and 1 each from measles, scarlet fever, whooping-cough, diphtheria, and infantile diarrhœa.

Irish Towns.—The 185 deaths in Dublin corresponded to an annual rate of 23·2, or 0·7 per 1000 below that recorded in the previous week, and included 10 from whooping-cough, 3 each from measles and influenza, 2 from infantile diarrhœa, and 1 each from scarlet fever and diphtheria. The 248 deaths in Belfast were equal to a rate of 31·3 per 1000, and included 33 from influenza, 5 from whooping-cough, 4 from infantile diarrhœa, and 2 each from measles and scarlet fever.

(Week ended April 10th, 1920.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18 million persons, the annual rate of mortality, which had been 17·9, 18·7 and 16·7 in the three preceding weeks, fell again to 16·6 per 1000. In London, with a population of nearly 4½ million persons, the annual death-rate was 17·6, or 1·3 per 1000 above that recorded in the previous week, while among the remaining towns the rates ranged from 6·3 in Cambridge, 7·8 in Wimbledon, and 7·9 in Smethwick, to 23·6 in Walsall and Halifax, 26·1 in Dudley, and 32·8 in Wigan. The principal epidemic diseases caused 440 deaths, which corresponded to an annual rate of 1·3 per 1000, and comprised 182 from measles, 101 from whooping-cough, 66 from diphtheria, 64 from infantile diarrhœa, 21 from scarlet fever, and 6 from enteric fever. Measles caused a death-rate of 3·0 in Wigan, 3·4 in Lincoln, and 3·6 in Newport (Mon.); whooping-cough of 1·2 in Southampton and 2·4 in Darlington; and diphtheria of 2·0 in Bootle and Aberdare. The deaths from influenza, which had been 312, 392, and 379 in the three preceding weeks, declined to 332, and included 105 in London, 30 in Birmingham, 13 in West Ham and in Manchester, and 10 in Plymouth. There were 2011 cases of scarlet fever, 1995 of diphtheria, and 26 of small-pox under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 2023, 1983, and 20 at the end of the previous week. The causes of 30 of the 5662 deaths in the 96 towns were uncertified, of which 6 were registered in Birmingham, 3 in Southend-on-Sea, and 2 each in Liverpool and Warrington.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2½ million persons, the annual rate of mortality, which had been 17·8, 18·0, and 17·2 in the three preceding weeks, slightly rose to 17·3 per 1000. The 380 deaths in Glasgow corresponded to an annual rate of 17·8 per 1000, and included 21 from influenza, 17 from measles, 5 each from whooping-cough, diphtheria, and infantile diarrhœa, and 1 from scarlet fever. The 103 deaths in Edinburgh were equal to a rate of 15·7 per 1000, and included 6 from influenza, 2 from infantile diarrhœa, and 1 from diphtheria.

Irish Towns.—The 213 deaths in Dublin corresponded to an annual rate of 26·8, or 3·6 per 1000 above that recorded in the previous week, and included 13 from whooping-cough, 7 from measles, 5 from influenza, 3 from infantile diarrhœa, and 1 from enteric fever. The 207 deaths in Belfast were equal to a rate of 26·1 per 1000, and included 20 from influenza, 2 each from scarlet fever and whooping-cough, and 1 each from measles, diphtheria, and infantile diarrhœa.

Colonel C. Pye Oliver, C.M.G., M.D., Assistant Director of Medical Services, Home Counties Division, has been placed on the commission of the peace for the county of Kent.

[1] Monthly Review U.S. Bureau of Labor Statistics, July, 1919.

Correspondence.

"Audi alteram partem."

ABDOMINAL EMERGENCIES.

To the Editor of THE LANCET.

SIR,—Professor Charles F. M. Saint, at the conclusion of his article in THE LANCET of April 10th on Abdominal Emergencies in which Operative Interference is either Contra-indicated or Restricted, justly states that the *general*[1] conclusions to be drawn from the cases that he cites are not new, but are worthy of recapitulation. In so far as he emphasises that operation is contra-indicated in certain abdominal emergencies, and the importance of making a careful investigation of history and symptoms, and thus arriving, if possible, at an accurate diagnosis by which an unnecessary operation may be avoided, his remarks are worthy of close attention. When, however, we come to study the cases he mentions in particular, certain statements he makes cannot be allowed to pass unchallenged, as the treatment he adopted, though apparently justified by the results, was, in my opinion, in certain instances surgically unsound. Let us take Case 15, the leaking duodenal ulcer. In this case the diagnosis made was a ruptured duodenal ulcer with a small leak which, though affecting the general peritoneal cavity at first, was *apparently*[1] at the time of admission, 36 hours after onset, "shut off." Operation was vetoed because he had "obvious trouble" in the chest, emphysema, and bronchitis, and there was a trace of sugar in his urine. After a somewhat slow convalescence he was discharged from hospital "much improved." I am not aware whether there are any statistics available of the results of the non-operative treatment of ruptured gastric or duodenal ulcer, but most surgeons will probably agree that the percentage of recoveries is extremely small and that the unfortunate existence of a belief in its efficacy has led to some terrible disasters.

Moynihan writes: "The possibility of spontaneous recovery, though not denied, is yet so remote as to make it imperative to adopt operative treatment at the earliest possible moment. The risk of operation is definite, the hazard of delay is immeasurable." Although it be admitted that the perforation was subacute, yet the risk of subphrenic abscess or of a septic inflammation spreading through the diaphragm to the chest was by no means inconsiderable. This gambler's throw was indulged in because the urine contained a trace of sugar and the lungs were somewhat emphysematous.

I next come to a criticism of Case 4, a case of appendix abscess. On deep palpation a mass could be felt on the right side of the pelvis, and per rectum this same mass could be reached high up with the tip of the finger and readily demonstrated bimanually. An appendix abscess was diagnosed, but operation was vetoed because it was thought probable that the abscess would evacuate itself naturally into the rectum. If we follow the good old surgical maxim to evacuate pus immediately we surely cannot go far wrong. What guarantee have we that the collection of pus before it has obliged the surgeon by emptying itself into the rectum may not track up and involve the subphrenic space or even burst and involve the general peritoneal cavity. Here, again, surely "the risk of operation is definite; the hazard of delay is immeasurable."

Case 11.—Pneumococcal peritonitis. A girl, aged 9, had acute peritonitis, which from a consideration of the history was considered to be pneumococcal and operation again vetoed. The little patient lingered on for four days and then passed away. Now, although the prognosis of the diffuse type and pneumococcal peritonitis is bad, it is by no means hopeless. Annand and Bowen[2] give particulars of 46 cases of the diffuse variety, of which 18 underwent operation. "Of the 18 cases operated on 6, or 33·3 per cent., recovered, whereas all those not operated upon died." The statistics given by Rischbieth,[3] Carmichael,[4] and Cameron,[5] although all emphasising the seriousness of the prognosis, show that the latter is by no means hopeless. It is difficult to understand why operation was vetoed with its chances of success, whereas the only alternative for the little sufferer was death.

I am, Sir, yours faithfully,

A. G. T. FISHER, *M.C.*, M.B., Ch.B., F.R.C.S. Eng.,
Surgical Specialist to Appeal Boards, Ministry of Pensions, &c.
late Surgical Specialist, R.A.M.C.

London, April 12th, 1920.

[1] The italics are mine.
[2] THE LANCET, 1906, vol. i., p. 1591.

THE HIPPURIC ACID SYNTHESIS TEST.

To the Editor of THE LANCET.

SIR,—The kidney, like the liver, is an organ with multiple functions. Every one of these functions must be tested individually, and among them is the synthesis of hippuric acid, which is more especially the work of the renal parenchyma. Therefore it is logical to think that the study of hippuric acid elimination may give useful data as regards the functional condition of the kidney. We do not wish to substitute any new method for methods which have proved their value, but simply to add a test which furnishes an independent and complementary control.

Hippuric acid elimination is profoundly influenced by diet. The greater the intake of food the greater the output of hippuric acid. The hippuric acid output is remarkably constant in the same individual taking every day about the same diet, both as to quality and to quantity. In five consecutive days differences found were very slight. Therefore it is enough to make a single estimation, providing a diet not devoid of green vegetables has been taken.

The "normal" figure measuring hippuric acid elimination gives no information as to how the renal parenchyma is functioning. Healthy individuals will give results varying greatly according to diet. Hence it is necessary to base a test on conditions not dependent on the intaken food.

The normal amount of hippuric acid having been estimated, we give the patient a dose of 0·5 g. of benzoic acid and another of 0·5 g. of glycocoll. Even this dose of glycocoll may be dispensed with, as the organism is able to manufacture it when needed, but it has the advantage that it greatly diminishes the slight toxicity of benzoic acid. From the time of taking these doses the total amount of urine is collected during 24 hours. Normally the synthesis should be complete within that time, and analysis should show an excess over normal of about 0·74 g. for 24 hours. This is the theoretical amount, but usually the excess is between 0·68 and 0·70. Since the normal output for a healthy subject is about 0·40 g., the figures we should expect to find are somewhat as follows: 1·14 g.—that is, 0·40 g. the normal amount and 0·74 the amount synthesised from the benzoic acid and glycocoll we have given. When the figure is lower, say 0·50, 0·40, &c., it may be asserted that the hippuric function is abnormal, and that probably there is some renal parenchymatous disorder. If this be the case, the analysis must be repeated on the following day to see if the experimental synthesis shows protracted insufficiency. In serious cases there may be no synthesis whatever on the following day, and the "normal" output found before the dosing is returned to. Generally the complementary amount is found, and the total synthesis is complete in 48 instead of 24 hours.

This test is mostly useful if carried out several times at fixed periods; for instance, at weekly intervals. I have had the opportunity of following patients and of noting either progressive augmentation or diminution of hippuric acid output in connexion with treatment.

From the point of view of hydrology, I am certain this method of investigation merits attention. Professors Desgrez and Adler have shown that acids diminish the

[3] Quart. Journ. of Med., Jan. 11th.
[4] Brit. Med. Jour., Sept. 18th, 1909.
[5] Proc. Roy. Soc. Med., 1912, vol. i., pp. 123-133.

power of the kidney to produce hippuric acid. On the other hand, I have noted that diuretic waters (sulph. calc.) favour such a production, exciting the renal parenchyma, sometimes to such an extent as to double the output. I am, Sir, yours faithfully,

P. LOUIS VIOLLE,
Médecin-Consultant.

Vittel, April 3rd, 1920.

TREATMENT OF GUINEA-WORM.

To the Editor of THE LANCET.

SIR,—Towards the close of his interesting note on the treatment of guinea-worm, which appeared in your issue of April 10th, Dr. J. Graham Forbes states that he welcomes the appearance of Dr. J. W. S. Macfie's paper on the use of intravenous injections of tartar emetic (THE LANCET, March 20th), especially as "there has been no advance in our knowledge of an effective cure for guinea-worm which will cut short the tedium and risk of slow extraction by winding in vogue for so many years."

It seems advisable, therefore, to record the fact that both Jeanselme [1] and Montpellier [2] have recently employed injections of arsenobenzol, apparently with considerable success. I append the references, as they may be useful.—I am, Sir, yours faithfully,

ANDREW BALFOUR.

Wellcome Bureau of Scientific Research, 25–27, Endsleigh-gardens, N.W. 1, April 12th, 1920.

THE ÆTIOLOGY OF EFFORT SYNDROME.

To the Editor of THE LANCET.

SIR,—The results of Dr. Gordon Barlow's thorough investigations on the Ætiology of Effort Syndrome recorded in your issue of March 13th rightly emphasises the recognition of infection as a common cause of the condition. His conclusions on the nervous origin of these cases, however, do not seem to be warranted even by his own findings. I think there is little or no justification for giving the nervous element so insignificant a place. All we know is that there is in a good many of these cases a definite illness, of some such kind as influenza, from which the effort syndrome itself or the physical inactivity which leads to it dates. It is by no means proved that, in some cases at least, the nervous depression following such a condition, or the simple weakness of convalescence merely prolonged, is not the father to the inactivity which leads to the effort syndrome. It seems to me that the evidence deduced by Dr. Barlow goes to prove beyond a doubt that a nervous state and the effort syndrome are very much more often than not conditions associated as sequel and cause, and vice versa. If there is any one thing as important as any other in Dr. T. Lewis's "The Soldier's Heart and the Effort Syndrome" it is the multiple ætiology assigned to effort syndrome; in fact, the use of the term seems to be justified only in so far as it implies a vague ætiology.

With the introduction of new terms the tendency seems to prevail of limiting our attention to the condition of the organ which was responsible for the introduction of the new term. From this weakness of ours I suppose arises the attempt to exclude the nervous factor in the causation of the effort syndrome. The man in the street knows as well as the physician that the weakness following any illness is not a manifestation of damage done to the heart alone, except, perhaps, in rheumatic fever. In the case of influenza, which is so important an ætiological factor in the effort syndrome, the harm done to the body as a whole is most obvious, and its special effect on the nervous system is apparent as nervous depression. Why in the face of all that the histories of these patients show—disturbed sleep, terrible dreams, worry, anxiety, and a host of other symptoms—an attempt is made to eliminate the nervous factor is not clear. Perhaps it is partly because we explain them as "neuroses," ill-defined but none the less clinical entities. From the examination of a large number of these cases I am convinced that the nervous element is a very important factor both in the production and the aggravation of this condition. It seems to me that the cardiac manifestations are only more obvious, and the nervous still linger in the threshold of the "neurotic" and the "neurasthenic" state. The latter are less obvious but no less important from the point of view of treatment. We know that apart from deficient physical exercise, neglected convalescence from acute illnesses and excessive physical exercise, other conditions may produce the effort syndrome, at least transiently, from some hours to a day or two, for example, traumatic neurasthenia (in which may be included "war-neurasthenia"), insomnia, the condition of the "morning after the night before." We can demonstrate this ourselves if only we break rest for two or three nights consecutively and attempt anything like moderately hard work. Just because we have begun to use a new term, the effort syndrome, when it essentially means symptoms of general weakness, why should we try to prove that in the former the symptoms cannot be of nervous origin, whilst in the latter it can. Both from the point of view of treatment and of the diagnosis of the more serious conditions which can give rise to the effort syndrome it seems wiser to regard the condition as having a multiple ætiology. Furthermore, it can hardly be denied that every bad case of neurasthenia exhibits the effort syndrome, and, at least in these cases, neurasthenia remains the cause of the condition. True enough these cases are no longer "effort syndrome" as some look at it, for the nervous symptoms predominate.

Even so eminent a cardiologist as Dr. Lewis only entertains the unlikelihood of this condition having a "*purely* nervous origin." It is very true all these cases cannot be said to be due to a "functional neurosis," but that not a few are of nervous origin has yet to be disproved. We cannot lay too much stress on a primary origin, for a history of infection is positive not only in a large percentage of "effort syndrome" cases, but in all kinds of patients or even healthy men. The fact that judicious exercises cure these cases does not disprove the nervous origin of some at least of them, for no treatment can be better for anybody in the pre-neurasthenic state. It seems to me to be, on the whole, better to look on these cases as of dual origin at least, for if such a conception draws our attention to the simultaneous treatment of the nervous system, the rest of the body—and the mind—our patients will have the most thorough treatment.

I am, Sir, yours faithfully,

H. O. GUNEWARDENE, M.B., B.S. Lond.,
Clinical Assistant, National Hospital for Diseases of the Heart.

London, April 10th, 1920.

VACCINES AND THE DIPHTHERIA CARRIER.

To the Editor of THE LANCET.

SIR,—If I may presume to make comment on Professor J. Eyre's most interesting letter in your issue of April 10th on the above subject, I might say that in my original thesis, of which the paper appearing in THE LANCET of March 27th was a synopsis, I reviewed the literature relating to the problem of the diphtheria carrier and quoted in full the passage from Bosanquet and Eyre, "Serums, Vaccines, and Toxins," pp. 134–136, which included the sentences brought to notice by Professor Eyre. My comment was that vaccine treatment was not unduly obtruded and, the recommendation that it should be "autogenous," made its application unattractive and its general availment problematical. I have had no experience of "autogenous" diphtheria vaccine, but the question of the superiority of "polyvalent" diphtheria vaccine is still under consideration and only awaits time and experimental proof for its elucidation. As, however, the series of cases dealt with was treated with "monovalent" vaccine, I fear that "confirmatory evidence" for the efficacy or superiority of any other was hardly afforded. Any claim made was for the realisation that with a large number of patients consistent results were obtained in a reasonable time

[1] Jeanselme, E.: Bulletin de l'Académie de Médecine (Paris), 1919, Feb. 4th, Year 83, 3 Ser., vol. lxxxi., p. 156.
[2] Montpellier, J.: Bulletin de la Société de Pathologie Exotique, 1919, Dec., vol. xii., p. 750.

and that, accordingly, the absolute necessity for "autogenous" vaccination appeared not to exist. To make autogenous vaccines for hundreds, if not thousands, of diphtheria carriers would entail such an expenditure of labour, time, and money as very effectually to put their general employment outwith the province of routine practice and practicable therapeutics. After all, the necessary facilities for the elaboration of complex media are not given to everyone who has to work with such cases, nor can the requisite technical skill on the part of the administrator often be presumed. On the other hand, "stock" vaccine might quite readily be produced centrally and distributed much in the same way as is practised with antidiphtheritic serum itself.

Unquestionably, availability coupled with ready and easy administration are the criteria by which any therapeutic measure must be judged. Only in so far as these are present will general favour be bestowed on it. It is scarcely necessary to suggest that if antidiphtheritic serum required to be autogenous, and if every physician who to-day considers its administration a simple routine practice were called upon to undertake its manufacture diphtheria would not claim for itself the finest results in the whole field of serum therapy. If the omission of "washing with several changes of normal saline" increases the liability to "uncomfortable local reactions" it has not manifested itself in over 200 injections of four separate vaccines extending over a period of years, but if experience proved the necessity, such (and other refinements of technique which may from time to time be devised) might well be practised without materially affecting the labour of preparation. This very circumstance might conceivably be used as an additional plea for the advisability of producing "bulk" vaccine, as by such manœuvre the undoubted liability to error through variability of media would be eliminated.

I am, Sir, yours faithfully,

J. L. BROWNLIE.

Glasgow Corporation Laboratory, April 10th, 1920.

CARDIAC ENLARGEMENT IN CHILDREN: THE X RAY DATA.

To the Editor of THE LANCET.

SIR,—I should be greatly obliged if any of the readers of THE LANCET, who may have had experience in X ray methods of detecting and estimating cardiac enlargement, could inform me if, in their experience, the X ray data which are laid down for estimating cardiac enlargement in adults hold good in children. This question more especially refers: (*a*) to the "Cardiac-Thoracic Diameter Ratio," in adults, 39 to 50 per cent. normal, and 53 per cent., or over, pathological; and (*b*) to the apical "Index of Depth," of 7–14 mm. normal, in the adult, and 20 mm. and above pathological.

In particular, I would like to obtain a table of the various "Indices of Depth" at different ages. For instance, if, in a child of 6 years, the index of depth is 6 mm. and the cardiac-thoracic diameter ratio is 46 per cent., could such a heart be considered enlarged? My view is that it would not.

I am, Sir, yours faithfully,

C. FRED. BAILEY.

Royal Sussex County Hospital, Brighton, April 10th, 1920.

BLIND MASSEURS.

To the Editor of THE LANCET.

SIR,—Probably those of us who do not agree with all that has been written in favour of the blind masseur have been restrained by our sympathy for the individual, but I feel that to allow one side of the question only to be stated is unfair both to the patients and to those doctors who have not specialised in this particular form of treatment. The following points require consideration:—

1. No blind person can satisfactorily control the free-standing exercises used in the treatment of the common deformities. Even the resistive exercises and pressures can only be applied by the continuous handling of the patient from head to foot. Such handling is obviously undesirable, and to my mind positively detrimental to the treatment. The following exercises may be mentioned as a few examples beyond the scope of the blind:—Klapp's creeping exercises, Fraenkel's exercises, hanging in head suspension apparatus, side-lying over boom, balance walking, correcting in belt.

2. Only the sighted can control the balance and coördination exercises used for chorea, tabes, disseminated sclerosis, &c. In these cases, handling of the patient destroys the desired effect.

3. In the treatment of cardiac cases the most careful observation is absolutely essential. No blind gymnast can possibly detect the slight changes in colour and general expression which are the early warnings of strain.

4. The coöperation of the patient is especially necessary when the gymnast is blind. It is common knowledge that certain patients, malingerers and not infrequently school children, rather than being helpful, are positively obstructive. It is the simplest thing in the world for a troublesome patient to completely deceive the blind and so nullify the treatment.

5. The general practitioner frequently states that the private patient expresses reluctance to being treated by anyone not physically fit. The private patient is, of course, free to make his choice, but the exercise of this somewhat natural instinct is denied to the hospital patient. In this connexion I should like to point out that the sighted workers in a large department invariably find that they have extra labour thrown upon them where a number of workers are blind, as it is universally admitted that special cases have to be picked out for treatment by the latter.

6. The capabilities of the blind in the field of electrotherapy still remain to be discussed.

For the above reasons I suggest that it is unfair to the blind themselves to insist that their work is absolutely equal to that of the sighted; and to demand from them an equal standard is to place them in a false position, which is not to their ultimate advantage. My excuse for giving these views is that I have come across a number of blind masseurs who feel very strongly their own limitations, and who state that more is being demanded of them than they can possibly accomplish.

I am, Sir, yours faithfully,

E. M. MAGILL, O.B.E., M.B., B.S.,

Late M.O. in charge of X Ray, Electro-therapeutic and Massage Departments, Military Hospital, Endell-street, W.C.

Bedford-place, W.C., April 11th, 1920.

AFTER-EFFECTS OF MALARIA.

To the Editor of THE LANCET.

SIR,—I should like to refer shortly to the letter in your issue of March 27th by Dr. A. Hurrell Style, whose observations suggest a causal connexion between malaria and arterio-sclerosis. That the malarial poison may be a producer of arterio-sclerosis, just as in the case of rheumatism, gout, scarlet or enteric fever, is quite possible, and that arterio-sclerosis is to found in a certain proportion of cases of malaria is certain. There is, however, in my mind a possible fallacy which would require to be eliminated in order that incidental concurrence may not confuse the issue—namely, that we have in very few cases indeed any evidence of the condition of the arteries prior to the incidence of malaria.

Those of us who had opportunities of examining many hundreds of young adults during the period of recruiting had occasion frequently to draw attention to the remarkable degree of arterio-sclerosis to be found occasionally in comparatively young men otherwise apparently healthy. It would certainly be of value if some observer could elucidate this point.

I am, Sir, yours faithfully,

JAMES R. WHITWELL, M.B.

St. Audry's Hospital, Melton, Suffolk, April 12th, 1920.

Sir James Barr, C.B.E., LL.D., has been appointed a Knight of Grace of the Order of the Hospital of St. John of Jerusalem in England.

Medical News.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—A quarterly meeting of the Council was held on April 8th, Sir George H. Makins, the President, being in the chair.—The secretary reported the death, on March 23rd, of Mr. George Arthur Wright, past member of the Council. The following resolution was passed:—

The Council hereby express their deep regret at the death of Mr. George Arthur Wright, whom they highly esteemed as an able surgeon, keenly interested in the advancement of surgical skill and knowledge, and they desire to convey to Mrs. Wright their sincere sympathy and condolence in the loss which she has sustained. The Council do also record their appreciation of Mr. Wright's services to the College as a member of the Council and also of his work in the museum at an earlier period of his professional career.

—A vote of thanks was given to Mr. C. Kirkman Finley for presenting through Mr. J. G. Turner, F.R.C.S., the skulls of 20 Burmese and 4 Chinese who were executed in gaols in Burmah.—A vote of thanks was given to Sir Rickman Godlee for presenting the original drawings which he had made for his "Atlas of Human Anatomy," 1880, and the calvaria of the patient he trephined in 1884 for the removal of a cortical tumour, the first operation of its kind.—In accordance with the recommendation of the Jacksonian Committee, it was resolved that the subject for the Jacksonian prize for the year 1921 should be "The Pathology, Diagnosis, and Treatment of Tuberculous Disease of the Spinal Column with its Complications."—The following Members of 20 years' standing were elected to the Fellowship: Henry Alexis Thomson, C.M.G., Professor of Surgery, University of Edinburgh, and Wilfred Thomason Grenfell, C.M.G., Superintendent of Labrador Medical Mission and of Royal National Mission to Deep Sea Fishermen.

CHADWICK PUBLIC LECTURES.—On May 4th, 7th, and 11th, at 5 P.M., in the Pathological Lecture Hall of the New Medical Schools at Cambridge, Dr. F. G. Crookshank will deliver three lectures on Man and Disease. On May 17th, at 7·30 P.M., in the Town Hall, St. Helens, Lancashire, Captain R. Reiss, chairman of the executive committee of the Garden Cities and Town Planning Association, will deliver a lecture on Housing and Health, and at 7 P.M. on May 12th and 13th, in the Town Hall, Colchester, Mr. A. J. Martin, M.Inst.C.E. will discuss the question of sewage and its disposal. Admission to these lectures is free.

UNIVERSITY OF MANCHESTER APPEAL.—The monotony of the appeals reaching us from educational and benevolent institutions throughout the country is pleasantly varied by the novel prospectus entitled "Lancashire Development Unlimited" just issued by the University of Manchester. For a month Manchester and the towns in its sphere of influence are to ring with the cry, "Invest in your University." In order to raise the £500,000 of new capital needed to maintain and develop the University an altogether original procedure is being adopted. Designed to appeal principally to prosperous business firms, many of which have already become subscribers, the requirements of the University are set out in the terminology of a company in which the public are invited to take shares, non-redeemable, and bearing no pecuniary interest, and thus provide new capital amounting to £500,000. It offers, on behalf of the University, 425,000 cumulative ordinary bonds of £1 each, and 1,500,000 cumulative participating people's bonds of 1s. each. The terms are: "On application as much as possible; on allotment, may be spread over three years at the option of subscriber." All citizens are invited to equip, endow, and enrich the work of the University, which touches life in all its phases, and are urged not to miss this "rare opportunity for a richly paying investment in the unlimited wealth of the human mind." Dealing with the profits and advantages to the investor, the prospectus refers to Lancashire's great cotton industry and to the health of her people as her first interest. The prospectus states that the faculties of medicine, surgery, and public health are constantly at work to ensure that hospitals are staffed with men of the highest competence, so that the child of the Lancashire weaver can get the same skilled treatment as the child of the millionaire. The chief faculties touch the lives of all the people at every point. Of the sum required £171,000 will be absorbed by various developments and extensions already decided upon. The war services of the University are on record, and with the return of peace it is hoped that "the new capital now issued for public subscription will enable the University to perform its appointed task of organising and leading our great county in the works of peace." The prospectus concludes: "You are earnestly invited to have a personal share in the development of Lancashire." Subscriptions may be sent to the organising secretary, Mr. G. A. Marriott, 9, Albert-square, Manchester.

A REUNION dinner of all the ladies and gentlemen who have served the 1st London (City of London) General Hospital (including its sections and auxiliaries) will be held on Wednesday, May 12th, at 7.30 P.M., in the Wharncliffe Rooms, Hotel Great Central, Marylebone-road, London, N.W., to be followed by an informal dance. Evening or mess-dress will be worn. Tickets, price 1 guinea, can be obtained before May 7th from the honorary secretary, Lieutenant-Colonel W. McAdam Eccles, 124, Harley-street, W.1.

EDWARD HAIN MEMORIAL COTTAGE HOSPITAL, ST. IVES.—The shareholders of Edward Hain Steamship Company and Lady Hain have given and endowed a cottage hospital at St. Ives, Cornwall, as a memorial to the late Captain Edward Hain, killed at Gallipoli. A large house has been purchased and fitted up as a cottage hospital and convalescent home to accommodate ten patients. £10,000 have been invested as an endowment fund, which will give an income of £500 per annum. The institution was formally opened on April 8th by Lady Hain, in the presence of a large gathering.

WINSLEY SANATORIUM, BATH.—The annual report of this institution for 1919 states that during the year 457 patients were admitted, compared with 500 in 1918. The average stay of each was 86 days against 77 in the preceding year. The results of the treatment continued to be very satisfactory. The income amounted to £10,815, and the expenditure was £10,942. The committee anticipates that the sanatorium will be able to accommodate a greater number of patients in the future.

SHERBORNE (DORSET) HOSPITAL.—The annual meeting of the friends of the Yeatman Hospital was recently held. The financial statement showed the annual income to be about £1500 per annum, whereas the expenditure was £4000; consequently a special subcommittee had reported that unless new sources of revenue were devised the hospital must be totally or partially closed. It was decided that, with the exception of old-age pensioners, all in-patients should be charged from 7s. 6d. weekly, and out-patients should pay 1s. for each visit.

THE ANGLO-AMERICAN UNIVERSITY LIBRARY FOR CENTRAL EUROPE.—A preliminary statement has been issued by Professor Gilbert Murray, Mr. Arnold Rowntree, and the Rev. William Temple, acting as trustees, designed to call earnest attention to a scheme for establishing in Central Europe under British and American auspices, libraries of recent English and American works, on gift or loan, which are indispensable to university teachers. The origin of the scheme may be traced to the relief work in Central Europe conducted by the English and American Society of Friends, by whom the privations of university teachers have been brought to attention. Owing to the unfavourable rate of exchange and the high cost of living the prices of recent English and American works on philosophy, science, and belles-lettres have made it impossible for the universities of Central Europe to keep in touch with English and American thought. (For example, 10s. books cost an equivalent of more than £9 in Germany and more than £30 in Austria.) As a consequence the scholars in these countries find themselves cut off from access to books printed in English since 1914. The object in view in forming the Anglo-American library is two-fold; the promoters aim at relieving the hunger of mind, while promoting that reconciliation of spirit which can only follow on the free interchange of ideas. The libraries, which will be organised on a broad, non-political, non-sectarian basis, so as to enlist the widest possible coöperation, will supply on loan books needed by the faculties of the different universities in Central Europe. They will be under the charge of British and American representatives, and committees of the foreign universities will be asked to superintend the local administration. Lord Bryce, Lord Robert Cecil, and other leading public men have promised their coöperation in carrying it out. In addition to the trustees mentioned above a consultative committee of British and American university men will be formed as soon as possible. With such assistance little difficulty need be anticipated in securing the necessary financial support. Professor Everett Skillings, of Middlebury College, Vermont, U.S.A., is leaving shortly for the Continent to confer with the university authorities there. The preliminary statement closes thus:—

"By taking the initiative in extending the hand of fellowship to colleagues in former enemy countries, British and American scholars are seizing a timely opportunity of helping to heal the wounds of the war and of exemplifying in a practical and convincing way the true 'international mind.'"

Mr. B. M. Headicar, librarian of the London School of Economics (University of London), Clare Market, London, W.C.2, is acting as Secretary of the Library, and all communications may be sent to him at that address.

ROYAL NATIONAL HOSPITAL FOR CONSUMPTION, VENTNOR.—The fifty-first annual general meeting of the governors of this hospital will be held at 33, Portland-place, London, W., on Monday, April 26th, at 4 P.M., the Right Hon. J. E. B. Seely in the chair.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL.—A course of post-graduate lectures on syphilis is being given by various members of the staff of King's College Hospital during the present year. On Friday, April 23rd, at 9.15 P.M., Sir StClair Thomson will speak on Syphilis of the Throat and Larynx.

AT the monthly meeting of Fellows of the Royal Faculty of Physicians and Surgeons of Glasgow, held on April 12th, Dr. James Alexander Adams was elected representative to the General Medical Council for the period of five years. Dr. Adams succeeds Dr. D. N. Knox, who has resigned on the ground of ill-health after holding office for 12 years.

THE annual medical meeting of the Society for the Propagation of the Gospel in Foreign Parts will be held at 8 P.M. on April 21st, in the Central Hall, Westminster, Dr. S. Russell Wells in the chair, when Rev. F. G. Hodder-Williams, M.B., B.S., Fellow of Allahabad University, will speak.

ROYAL MICROSCOPICAL SOCIETY.—This society, in conjunction with the Optical Society and the Faraday Society, is holding a discussion on the Mechanical Design and Optics of the Microscope at 20, Hanover-square, London, W., on Wednesday, April 21st, from 7 to 10 P.M. Professor John Eyre will preside, and Mr. J. E. Barnard, Dr. W. Rosenhain, and Professor A. E. Conrady, among others, will take part.

ROYAL ARMY TEMPERANCE ASSOCIATION.—The twenty-fifth annual meeting and conference of this association will take place at the Caxton Hall, Westminster, on May 4th. At the annual conference of regimental delegates and male friends, at 11 A.M., the chair will be taken by Lord Horne, and the speakers on "Alcohol in our life to-day" will include Dr. G. Basil Price and Mr. Arthur Evans.

INFLUENZA AND ENCEPHALITIS LETHARGICA IN SWITZERLAND.—In December, 1919, only 511 cases of influenza were medically notified in Switzerland (population, 4,000,000). In January, 1920, already 13,162, in February 83,008. In February, 1920, 440 cases of encephalitis lethargica occurred. The epidemic of influenza has almost ceased, that of lethargic encephalitis has greatly decreased. The number of deaths is not yet officially notified.

KING'S COLLEGE, LONDON, OLD STUDENTS' ASSOCIATION.—At a general meeting of old students held recently at King's College, Strand, it was decided to form an association for the purpose of promoting social intercourse and of keeping the members in touch with their old college. It is hoped to include students from all faculties and the subscription of 10*s.* 6*d.* per annum will include the *King's College Review*. Further particulars and forms of application for membership may be obtained from the honorary secretary, Miss M. A. W. Fairlie, 3, St. Julian's Farm-road, W. Norwood, S.E. 27.

LONDON AND COUNTIES MEDICAL PROTECTION SOCIETY.—The annual general meeting of this society was held at the offices, 32, Craven-street, Strand, London, on March 17th, when the annual report of the council, which showed both an increase of membership and a strengthened financial position, was presented. The total membership of the society on Dec. 31st, 1919, amounted to 5688, and during the year 65 members died, 121 resigned, and 689 were elected. The funds of the society increased from a surplus balance of £23,955 4*s.* 4*d.* in December, 1918, as compared with a balance of £25,825 11*s.* 1*d.* on the corresponding date of 1919. The council refer to the loss sustained by the deaths of a distinguished vice-president in Sir William Osler and a valued member of council in Dr. T. W. Atkinson.

CITY OF LONDON HOSPITAL FOR DISEASES OF THE CHEST: PAYMENTS BY PATIENTS.—At the annual court of governors of this hospital the chairman stated that although the financial position at the end of 1919 might be considered satisfactory, the outlook for the present year was by no means free from anxiety, particularly in view of the urgent need of structural improvements. The annual expenditure had risen from £14,000 in 1914 to £28,000 last year, and it was feared that in the coming year it would be still further increased. It was necessary to raise a substantial sum of money, and the committee had considered the desirability of trying to get some contributions from the patients. A resolution was passed giving the committee power to make such a charge as it might consider to be reasonable.

QUEEN VICTORIA CONVALESCENT HOME, DURDHAM DOWNS.—The annual report of this institution just issued states that from July, 1916, to July, 1919, the home was occupied by military patients, 1594 being admitted for an average stay of one month. The home has recently been thoroughly renovated at a cost of £2679, and will be ready for the reception of patients on May 1st. The committee appeals for £5000 to extend the building, and to provide additional accommodation for ten men and ten women. £1700 have been received, and it is hoped that the balance will shortly be subscribed.

THE CHEMISTS' EXHIBITION.—A visit to this exhibition, which was opened on April 12th at the Northampton Institute, Clerkenwell, left the impression that pharmacists and druggists and others related to the calling were serving well in the interests of the medical profession. There were some excellent specimens of fine drugs, chiefly synthetics and alkaloids, shown, but a feature of this year's collection was a profusion of perfume exhibits. It would appear that this industry is growing rapidly in this country, replacing, probably, foreign productions. The two halls were well stocked with interesting products, and the stalls were attractively arranged. That these occasions continue to receive the support of exhibitor and visitor alike is obvious from the fact that this is the twenty-first of the series, though gaps were caused, of course, during the years of the war. The organisers are the proprietors of the *British and Colonial Pharmacist* newspaper. The exhibition closed on April 16th.

IN the newspaper reports of the recent outbreak of fire at St. Dunstan's College for Blinded Soldiers, Regent's Park, reference has been made to the excellent manner in which the blinded men and their nurses escaped from the burning building. The St. Dunstan's authorities have given the question of prompt escape from their various buildings in case of fire their constant and earnest attention, and have spent considerable sums of money in providing suitable emergency exits, external staircases, and other fire escapes, for each of the homes in which they are interested. These arrangements have been efficiently carried out by and in consultation with Messrs. Merryweather and Sons, Greenwich and London, who have also instituted a system of periodical inspection of the fire extinguishing and escape arrangements. The blinded soldiers and the nurses are regularly drilled, and the wisdom of these measures was demonstrated at the recent fire.

Parliamentary Intelligence.

HOUSE OF COMMONS.

MONDAY, APRIL 12TH.

St. Luke's Hospital, Bradford.

Mr. MYERS asked the Minister of Health if his attention had been called to the agreement made between the Bradford corporation and the Bradford board of guardians in respect of the utilising of St. Luke's Hospital as a municipal general hospital; whether he was aware that this arrangement would enable the Bradford corporation to treat the sick, irrespective of their economic circumstances, and avoid the stigma attached to Poor-law treatment; whether the Ministry of Health was prepared to encourage and assist the project; and, if so, would he inquire into the circumstances prevailing in his department which were stated to be causing delay in putting the scheme into operation.—Dr. ADDISON replied: The scheme to which the honourable Member refers was approved by me last month.

Mr. LYLE: Will the consent of the Ministry of Health be extended to other local authorities putting forward similar proposals, and does this step agree with the policy enunciated in February, 1919, in this House and elsewhere? Is the right honourable gentleman now in a position to make a statement on the policy of the department in respect to voluntary hospitals?—The SPEAKER: The honourable Member had better give notice of that question.

Nurses and 1914 Star.

Lieutenant-Colonel FREMANTLE asked the Secretary for War whether nurses sent to Malta on active service in 1915 were ineligible for the 1915 medal, while nurses serving in Alexandria under similar conditions were entitled to it; and whether there were any reasons, other than those of administrative convenience, why equal services in Malta should not be equally recognised.—Mr. CHURCHILL replied: Service on the establishment of a unit in a theatre of war is essential to qualify for the award of the 1914-15 Star. Malta was not a theatre of war and nurses who served there in 1915 are consequently not eligible for the Star.

Obituary.

ALBERT JOHN CHALMERS, M.D. VICT. & LIVERP., F.R.C.S. ENG., D.P.H.

NEWS reached London last week that Dr. A. J. Chalmers died of acute infective jaundice in the General Hospital at Calcutta on April 5th. He was born at Manchester in 1870, son of Rev. James Chalmers, M.A., and was educated at Manchester Grammar School and University College, Liverpool. Qualifying in 1890, he held the Holt Fellowship of University College, Liverpool, before entering the West African Medical Service, acquiring in his four years on the Gold Coast that zeal for tropical medicine which lasted throughout his life. In 1901 he accepted a call to Ceylon, and for the next ten years was registrar at the Colombo Medical College, where he lectured on pathology and animal parasitology, and had the satisfaction of witnessing the development of the College into one of the principal teaching institutions in the East. After a period of service with the Pellagra Field Commission he became, in 1913, director of the Wellcome Tropical Research Laboratories at Khartoum, a position from which he was taking a well-earned study-holiday at the time of his early death. Chalmers was an enthusiast and a never-tiring worker, whose literary output was very large, as witness the 2500 pages of the third edition of the "Manual of Tropical Medicine," in every part of which he collaborated with Castellani. His work on madura foot and on tropical skin diseases in general is of permanent value, and tropical medicine has lost in him one of its most faithful servants. A loyal friend and a generous colleague, Dr. Chalmers was also a popular practitioner when the opportunity was open to him in Colombo. In 1911 he received the Coronation Medal, and he also held a medal and clasp for the Ashanti Expedition of 1900, but his chief honours lie in the work which he did and the work which he inspired others to do. Dr. Chalmers leaves a widow, daughter of the late Edwin Cannington, J.P., but no children.

HECTOR TREUB,

PROFESSOR OF GYNÆCOLOGY IN THE UNIVERSITY OF AMSTERDAM.

Professor Treub's death last week, in his sixty-fourth year, removes one of the best-known continental gynæcologists. Three sons were born to Burgomaster Treub, of Voorschoten, near Leyden. The eldest, Melchior, came to be professor of botany, and founded the important Institute of Tropical Botany on the island of Java; the youngest, Willem, also at one time professor in Amsterdam, became an authority on sociology and a leading member of the Lower Chamber; while Hector, at first in Leyden, transferred later to a professorial chair at Amsterdam, established his reputation as the leading authority on diseases of women in Holland, celebrating his 25-years' jubilee as professor in 1912. Treub was a prolific writer in Dutch medical journals on his special subject, his first published work in the domain of operative gynæcology dating from 1885, later extending over extra-uterine pregnancy, fibroma, sterility, retroflexion, and enteroptosis, as well as such general medical topics as the civil rights of practitioners, reformed clothing for women, and the co-education of medical students. In two little books on medico-political subjects he collaborated with A. Tak and C. Winkler. He was for 20 years co-editor of the *Geneeskundige Bladen*, published in Haarlem.

ALEXANDER HODGKINSON, M.D. MANITOBA, M.B., CH.B. VICT., M.SC. VICT.,

SURGEON TO THE WARRINGTON INFIRMARY.

Dr. A. Hodgkinson, who died at his home at Ivy Lodge, Warrington, on April 6th, after four days' illness with pneumonia, was in his forty-third year. In 1898 he obtained a B.Sc. degree in the Victoria University with first-class honours in zoology, proceeding to the M.Sc. in 1901. He gained the Dauntesey Entrance Medical Scholarship and the Dalton Natural History Scholarship. After taking his M.B., Ch.B. with honours, he spent some time in resident hospital appointments at Warrington Infirmary and elsewhere, and then settled in practice in Warrington, where he had a large connexion. At various times he held visiting posts at the Warrington Union Infirmary, the Warrington General Infirmary, and the Whitecross Military Hospital. He was at all times deeply interested in natural science, and for a time lectured at the Warrington Technical School on this subject. It was a surprise to many that he did not adopt a purely scientific career, for which in his student days he appeared destined. In 1914 he proceeded to the ad eundem M.D. degree of the University of Manitoba.

THE LATE DR. T. W. LAMBERT.—Thomas Wilson Lambert, who died suddenly at Mentone on March 31st in his fifty-eighth year, was a native of Yorkshire, and was educated at Cheltenham and at Pembroke College, Cambridge. After qualifying with the M.R.C.S. Eng., L.R.C.P. Lond., in 1889, he held house appointments at St. Thomas's Hospital, where he had received his medical training, and in the following year graduated M.B., Ch.B. at Cambridge University. Subsequently he was appointed medical officer to the Canadian Pacific Railway, and to the Royal Inland Hospital, Kamloops. For many years he held a prominent position in Columbia, and in 1897 was elected vice-president of the College of Physicians and Surgeons of British Columbia, holding the office of president 1898-99. On his return to Europe he spent part of his time in England and part in Norway, and numbered among his friends in the latter country Henrik Ibsen. During the war he acted as director of the Scandinavian section of the Foreign Press Department at the War Office. Dr. Lambert was an ardent sportsman, and was the author of a book on "Fishing in British Columbia." At Cambridge he was a famous oar, rowing for the University against Oxford on several occasions.

The Services.

R.A.M.C. PAY IN INDIA.

THE new scale of grade pay for officers of the Royal Army Medical Corps in India has effect from July 1st, 1919. The scale is as follows:—

	Rs. per month.
Lieutenants	550
Captain, on promotion	650
Captain, after 5 years' total service	700
Captain, after 7 years' total service	750
Captain, after 10 years' total service	850
Major, on promotion	950
Major, after 3 years as such	1050
Lieutenant-Colonel	1350
Lieutenant-Colonel, after 3 years as such	1500

Charge allowances are admissible in addition. Army of occupation bonus is not paid with these rates, but where the old rates with the bonus are more favourable they may be retained until the general abolition of the bonus or until promotion, whichever is earlier. These rates of pay are provisional and will be subject to revision when permanent rates of pay for the medical services in India are fixed. The new rates of pay in the Indian Medical Service were published in THE LANCET of May 3rd, 1919, p. 764, and may be referred to for purposes of comparison.

ROYAL NAVAL MEDICAL SERVICE.

Surgeon Lieutenants to be Surgeon Lieutenant-Commanders: H. B. Parker, J. L. Priston, R. F. Quinton, M. J. Aitken, J. A. Maxwell, M. S. Moore, W. G. Thwaytes, C. E. Greeson, W. F. Beattie, H. W. Fitzroy-Williams, F. E. Fitzmaurice, T. J. O'Riordan, J. C. Kelly, J. M. Horan, G. M. M. Graham, F. C. Hunot.

ARMY MEDICAL SERVICE.

Major-Gens. J. Thomson and A. A. Sutton and Cols. J. D. Alexander and F. R. Buswell retire on retired pay.

Major-Gen. J. B. Wilson, from half-pay list, is restored to the establishment.

Col. L. P. More is placed on half pay.

Temp. Col. A. Carless (Major, R.A.M.C., T.F.) relinquishes his temporary commission on re-posting.

TERRITORIAL FORCE.

Col. C. P. Oliver, K.H.P., from T.F. Reserve, to be Colonel.

ROYAL ARMY MEDICAL CORPS.

Major E. Gibbon to be temporary Lieutenant-Colonel whilst specially employed.

Temp. Capt. (acting Major) F. R. Kirkham to be acting Lieutenant-Colonel.

The undermentioned Captains retire receiving a gratuity: G. E. Dyas, J. Y. Moore.

Capt. D. S. Buist is restored to the establishment.

Lieutenants (temporary Captains) to be Captains: A. H. Clarke, G. G. Drummond, D. R. Hennessy.

Temp. Lieut. W. N. Leak to be temporary Captain.

Officers relinquishing their commissions:—Temp. Lieut.-Col. L. W. Rolleston on ceasing to serve with the County of Middlesex War Hospital (retains the rank of Lieutenant-Colonel); Temp. Major (acting Lieut.-Col.) C. M. Row is granted the rank of Lieutenant-Colonel. Temporary Captains granted the rank of Major: D. C. Taylor, H. B. Wilson, C. Roche. Temporary Captains retaining the rank of Captain: J. H. Campain, P. H. Day, F. A. Stokes, G. A. Hayman, C. L. S. James, H. Spong, G. H. Roberts, W. A. Todd, A. Lundie, W. E. K. Coles, G. R. E. Colquhoun, F. R. Martin, H. M. Berry, H. E. C. Fox, C. H. Broomhead, T. Hamilton, E. J. Manning, W. R. Reeds, E. Evans, E. R. Barton, J. I. F. Knight, L. W. Jones, B. Muir, T. F. Pugh, F. A. Godson, A. H. Macklin, T. S. Forrest, R. E. Illingworth, F. King, W. A. Cochrane, J. C. Ryan, H. A. Hancock, A. H. Ernst, J. L. Callaghan, H. F. T. Chambers, T. W. Pattinson, H. W. Catto, A. J. A. Peters, S. E. Elphick, C. P. S. Allingham, C. H. Cox, H. J. Cotter, T. A. Beddy, J. B. Thackeray, W. A. Mahon, H. Baird, C. J. Morton, G. A. Crowe, R. Svensson. Temp. Hon. Capt. J. V. Ricci retains the honorary rank of Captain. Temp. Lieuts. W. M. Bristow and J. Campbell (retain the rank of Lieutenant).

TERRITORIAL FORCE.

Capt. (acting Lieut.-Col.) L. D. B. Cogan relinquishes the acting rank of Lieutenant-Colonel on ceasing to be specially employed.

Major T. L. Fennell, T.D., to be acting Lieutenant-Colonel whilst specially employed.

1st London General Hospital: Lieut.-Col. Sir A. E. Garrod is retired under paragraph 116, T.F. Regulations, and is granted the honorary rank of Colonel.

Major L. B. Rawling is seconded for duty with the 4th London General Hospital.

2nd London General Hospital: Major L. E. Shaw is retired under paragraph 116, T.F. Regulations.

5th Northern General Hospital: Capt. E. W. Holyoak is restored to the establishment.

ROYAL AIR FORCE.

Medical Branch.—Capts. D. S. Stevenson (acting Major), S. A. Clark, and A. K. Soutar are transferred to the unemployed list.

THE HONOURS LIST.

The following additions should be made to the list of promotions in and appointments to the Most Excellent Order of the British Empire, published in THE LANCET of April 10th, p. 839:—

C.B.E.—E. D. Maddick, O.B.E.

O.B.E.—Lt.-Col. H. M. Brownfield.

M.B.E.—W. J. Durant; J. W. Mason.

BOOKS, ETC., RECEIVED.

APPLETON, D., AND CO., London and New York.
The Diseases of Infancy and Childhood. By L. E. Holt, M.D., and J. Howland, M.D. 7th ed. Pp. 1180. 35*s*.

ARNOLD, EDWARD, London.
Dr. G. Herschell's Text-book of Indigestion. Revised and re-written by A. Abrahams, O.B.E., M.D. 4th ed. Pp. 228. 10*s*. 6*d*.
Diagnosis of Nervous Disease. By Sir James Purves Stewart, K.C.M.G., M.D. 5th ed., revised and enlarged. Pp. 584. 30*s*.

BALE, J., SONS, AND DANIELSSON, London.
An Atlas of the Primary and Cutaneous Lesions of Acquired Syphilis in the Male. By Major C. F. White, R.A.M.C., and Dr. W. H. Brown. With Foreword by Lieut.-Gen. Sir T. H. J. C. Goodwin, Director-General, A.M.S. Pp. 32 and plates. 27*s*. 6*d*.

CHURCHILL, J. AND A., London.
Principles of Human Physiology. By Prof. E. H. Starling, C.M.G., F.R.S. 3rd ed. Pp. 1315. 26*s*.
Sight Testing Made Easy. By W. Wright Hardwicke, M.D. 4th ed. Pp. 80. 5*s*.
Gynæcology for Students and Practitioners. By T. W. Eden, Major R.A.M.C., and C. Lockyer, M.D., F.R.C.P. 2nd ed. Pp. 928. 38*s*.

FROWDE, HENRY, AND HODDER AND STOUGHTON, London.
Functional Nerve Disease: an Epitome of War Experience for the Practitioner. Edited by H. C. Miller, M.D. Pp. 208. 8*s*. 6*d*.
Cunningham's Manual of Practical Anatomy. Revised and edited by Prof. A. Robinson. 7th ed. Vol. II. Pp. 524. 12*s*. 6*d*.
A Manual of Venereal Diseases for Students. By L. W. Harrison, D.S.O., M.B., Ch.B. Pp. 360. 16*s*.
Sympathetic Nervous Symptom in Disease. By W. Langdon Brown, M.D. Cantab. Pp. 161. 10*s*. 6*d*.

KIMPTON, H., London.
Handbook of Diseases of the Rectum. By L. J. Hirschman, M.D. 3rd ed. Pp. 378. 30*s*.
The After-treatment of Surgical Patients. By W. Bartlett, A.M., M.D., and Collaborators. 2 vols. Pp. 1066. £3.
The Systematic Development of X Ray Plates and Films. By L. Wendell, B.S., D.D.S. Pp. 78. 12*s*.

LEWIS, H. K., AND CO., London.
The Link Between the Practitioner and the Laboratory. By C. Fletcher, M.B., B.S., and H. McLean, B.C. Cantab. Pp. 91. 4*s*. 6*d*.
The Sexual Disabilities of Man and their Treatment and Prevention. By A. Cooper, Consulting Physician to the Westminster General Dispensary. 4th ed. Pp. 266. 7*s*. 6*d*.

LIPPINCOTT, J. B., COMPANY, Philadelphia and London.
Psychology from the Standpoint of the Behaviorist. By Prof. J. B. Watson. Pp. 429. 10*s*. 6*d*.
The Physical Basis of Heredity. By Prof. T. H. Morgan. Pp. 305. 10*s*. 6*d*.
Inbreeding and Outbreeding. By E. M. East, Ph.D., and D. F. Jones, Sc.D. Pp. 285. 10*s*. 6*d*.

LONGMANS, GREEN, AND CO., London.
Tuberculosis and Public Health. By H. Hyslop Thomson, M.D., D.P.H. Pp. 104. 5*s*.

MACDOUGALL, A., Mitchell-street, Glasgow.
With the 1st Lowland Field Ambulance in Gallipoli. By Col. G. H. Edington, A.M.S. (T.F.). Pp. 72.

MALOINE, A., ET FILS, Paris.
Chapitres Choisis de Chirurgie. Par G. L. Rejard, Ancien Médecin Aide Major. Avec une Préface de M. O. Jacob, Médecin-Inspecteur. Pp. 430. 20 fr.
La Génération Humaine. Par Dr. G.-J. Witkowski. In-8, 108 fig., 3 planches en couleurs, découpées et superposées. 9th éd., revue et corrigée. Pp. 224. 22 fr.
Santé, Comment se bien porter (D'Après L'enseignement Théosophique). Par Dr. A. Auvard. Pp. 254. 4.50 fr.
Carnet Calendrier de Traitement Anti-syphilitique. Par M. le Dr. Gougerot. Pp. 16. 1 fr.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE 1, Wimpole-street, W.

Tuesday, April 20th.

GENERAL MEETING OF FELLOWS: at 5 P.M.
Ballot for Election to the Fellowship. (Names already circulated.

MEETINGS OF SECTIONS.

Tuesday, April 20th.

THERAPEUTICS AND PHARMACOLOGY (Hon. Secretaries—Philip Hamill, Douglas Cow): at 4.30 P.M.
Dr. Ransom: Action of Strontium on Frog's Heart.
Dr. G. Graham: Source of Uric Acid excreted in Urine after Administration of Atophan.

PATHOLOGY (Hon. Secretaries—J. A. Murray, Cecil Price-Jones): at 8.30 P.M.
Annual General Meeting—Election of Officers and Council for 1920–1921.
Dr. J. A. Murray: Autologous Grafting of an Adenocarcinoma of the Rabbit's Uterus.
Dr. Topley: The Site of Formation of Antibodies.
Dr. Lyon Smith: Direct Hæmolysis; a Test for Bacterial Toxins, and for the Quantitative Estimation of Doses of Bacterial Vaccines.

Wednesday, April 21st.

HISTORY OF MEDICINE (Hon. Secretaries—Arnold Chaplin, F. G. Crookshank): at 5 P.M.
Dr. Arnold Chaplin: The History of Medical Education at the Universities of Oxford and Cambridge.
Madame Panayotatou, Ph.D.: Baths and Bathing in Ancient Greece.

Friday, April 23rd.

STUDY OF DISEASE IN CHILDREN (Hon. Secretaries—E. A. Cockayne, H. C. Cameron, C. P. Lapage): at 4.30 P.M.
Papers:
Dr. D. H. Paterson: Three Cases of Renal Dwarfism.
Dr. Parkes Weber: Remarkable Example of Suprarenal Tumour in a Child, of the Robert Hutchison Type (?).

EPIDEMIOLOGY AND STATE MEDICINE (Hon. Secretaries—William Butler, Major Greenwood): at 8.30 P.M.
Dr. E. W. Goodall: Typhus in Poland, 1916–1919.
Those Members of the Section who wish to attend the dinner at the Welbeck Palace Hotel, at 7 P.M., are requested to notify Dr. Major Greenwood, Lister Institute, Chelsea Gardens, S.W.1, not later than April 21st.

ILLUMINATING ENGINEERING SOCIETY, at the Royal Society of Arts, 18, John-street, Adelphi, W.C.
TUESDAY, April 20th.—8 P.M., Discussion on The Lighting of Churches, opened by Mr. J. Darch.

CHELSEA CLINICAL SOCIETY, in St. George's Hospital Medical School.
TUESDAY, April 20th.—8.30 P.M., Paper:—Dr. K. Eckenstein: Experiences of the French Medical Service at the Front (illustrated by lantern slides).

LONDON DERMATOLOGICAL SOCIETY, St. John's Hospital, 49, Leicester-square, W.C.
TUESDAY, April 20th.—4.30 P.M., Pathological Specimens. Cases sent for Consultation. Clinical Cases will be shown by Dr. J. L. Bunch, Dr. W. Griffith, Dr. E. J. D. Mitchell, Dr. W. K. Sibley, Dr. Morrison, Dr. Eva White, and Dr. S. Kapoor.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.

MONDAY, April 19th.—2 P.M., Mr. MacDonald: Surgical Outpatients. 5 P.M., Dr. A. Saunders: Parenchymatous and Mixed Nephritis.

TUESDAY.—10 A.M., Dr. Robinson: Gynæcological Operations. 5 P.M., Dr. Pernet: Pityriasis Rosea.

WEDNESDAY.—10 A.M., Mr. Banks Davis: Operations of the Throat, Nose and Ear. 5 P.M., Mr. Addison: Acute Infective Osteomyelitis.

THURSDAY.—10.30 A.M., Dr. Simson: Gynæcological Demonstration. 5 P.M., Mr. Page: Anæsthetics.

FRIDAY.—2 P.M., Dr. Morton: X Ray Department. 5 P.M., Dr. Burnford: Clinical Lecture with Cases.

SATURDAY.—12 noon, Mr. Sinclair: Surgical Anatomy of the Abdomen. 2 P.M., Dr. Beddard: Visit to Medical Wards.

Daily:—10 A.M., Ward Visits. 2 P.M., In-patient and Out-patient Clinics and Operations.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL (UNIVERSITY OF LONDON).

A Course of Post-Graduate Lectures on Syphilis is being given by various members of the staff of King's College Hospital during the present year.

FRIDAY, April 23rd.—9.15 P.M., Sir StClair Thomson: Syphilis of the Throat, Larynx, &c.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton, S.W.

MONDAY, April 19th.—2 P.M., Dr. Melville: X Ray Department.

TUESDAY.—2 P.M., Dr. D. Grant: Throat Department. 2.30 P.M., Demonstration:—Dr. Wingfield: Chronic Fibroid Cases.

WEDNESDAY.—10.30 A.M., Dr. Punch: Demonstration of Museum Specimens. 2 P.M., Dr. Gosse: Cardiographic Department. 2.30 P.M., Demonstration:—Dr. Wall: Medium Cases.

THURSDAY.—10.30 A.M., Dr. Burrell: Artificial Pneumothorax. 2.30 P.M., Demonstration:—Dr. Burrell: Medium Cases.

FRIDAY.—2 P.M., Dr. Melville: X Ray Department. 2.30 P.M., Demonstration:—Dr. Punch: Medium Cases.

SATURDAY.—1 P.M., Dr. Batty Shaw: Special Demonstration in the Out-patient Department.

UNIVERSITY OF SHEFFIELD—FACULTY OF MEDICINE POST-GRADUATE LECTURES, at the Sheffield Royal Hospital.

WEDNESDAY, April 21st.—4 P.M., Prof. Hall: Encephalitis Lethargica.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE CLINIC.

TUESDAY, April 20th.—4.30 P.M., Lecture:—Mr. B. J. Rodway: Influence of Oral and Dental Lesions on General Medicine.

SALFORD ROYAL HOSPITAL AND ANCOATS HOSPITAL POST-GRADUATE DEMONSTRATIONS, at the two Hospitals alternately.

THURSDAY, April 22nd.—4.30 P.M., Mr. Jefferson: Neuralgia. (At Salford Royal Hospital.)

Communications, Letters, &c., to the Editor have been received from—

A.—Mr. J. Adams, Lond.

B.—Dr. J. L. Brownlie, Glasgow; Lady Barrett, Lond.; Dr. C. F. Bailey, Brighton; Dr. C. Bolton, Lond.; Dr. H. K. Brade-Birks, Wye; Board of Control, Lond., Sec. of; Sir J. Broadbent, Bart., Lond.; Board of Education, Lond.; Mr. H. W. Bayly, Lond.; Dr. A. D. Bigland, Liverpool; Dr. H. C. Bazett, Oxford; Dr. A. Balfour, Lond.; Dr. E. Bramwell, Edinburgh; Lord Blyth, Lond.; Sir E. N. Burnett, Lond.

C.—Chadwick Trust, Lond.; Dr. P. J. Cammidge, Lond.; Dr. A. Castellani, Lond.; Prof. E. L. Collis, Cardiff; Chicago School of Sanitary Instruction.

D.—Dr. H. Drinkwater, Wrexham; Dr. T. B. Davies, Lond.; Department of Scientific and Industrial Research, Lond., Sec. of; Mr. P. Dalton, Galloway; Duty and Discipline Movement, Lond.

F.—Mr. A. G. T. Fisher, Lond.; Dr. D. Firth, Lond.

G.—Messrs. G. Glaridge and Co., Bombay; Dr. H. O. Gunewardene, Lond.; Dr. S. R. Gloyne, Lond.; Gloucestershire Surgical Appliances Co., Cheltenham.

H.—Dr. I. Harris, Sheffield; Hunterian Society, Lond.; Mr. E. Holland, Lond.; Harveian Society of London; Harrogate Royal Baths, Gen. Manager of.

J.—*Journal of the American Medical Association; Journal of Industrial Hygiene*, Boston.

K.—Mr. N. C. King, Lond.; King's College Hospital Medical School, Lond.

L.—Mr. J. P. Lockhart-Mummery, Lond.; Dr. G. C. Low, Lond.; Dr. F. Langmead, Lond.; Dr. R. B. Low, Lond.; Dr. C. Lillingston, Gorleston.

M.—Ministry of Health, Lond.; Messrs. Merryweather and Sons, Lond.; Sir F. Mott, Lond.; Dr. J. B. Mennell, Lond.; Dr. E. M. Magill, Lond.; Metropolitan Asylums Board, Lond., Clerk to; Dr. H. L. Murray, Liverpool.

N.—National Health Week Committee, Lond.; National Safety Council, Chicago.

P.—Mrs. M. Prentice, Lond.; Dr. C. Porter, Lond.; Capt. A. E. H. Pinch, Lond.; Peoples' Refreshment House Association, Lond.

R.—Royal Institution of Great Britain, Lond.; Dr. B. Robinson, New York; Dr. J. D. Rolleston, Lond.; Research Defence Society, Lond.; Royal Society of Arts, Lond.; Royal Army Temperance Association, Lond., Gen. Sec. of.

S.—Save the Children Fund, Lond.; Dr. S. H. Stewart, Glenlomond; Mr. A. T. Scott, Lond.; Mr. R. E. Smith, Barry; Dr. F. D. Saner, Lond.; Dr. J. J. Scanlan, Lond.

T.—Dr. Wu Lien Teh, Peking; Dr. A. H. Thompson, Lond.; Mr. C. E. T. Thompson, Lond.; Mr. E. T. Thompson, Lond.

U.—University of Glasgow, Principal of.

W.—Dr. J. R. Whitwell, Melton; Dr. K. Walker, Lond.

Communications relating to editorial business should be addressed exclusively to the Editor of THE LANCET, 423, Strand, W.C. 2.

Appointments.

BASTARD, H. R., L.R.C.P. Lond., M.R.C.S., has been appointed Medical Officer for the Bow District by the Crediton Board of Guardians.

COLMER, V., L.R.C.P. Lond., M.R.C.S., Honorary Surgeon to the Tavistock Hospital, Devon.

DAY, C. D., L.M.S.S.A., District Medical Officer by the Dorchester Board of Guardians.

GROVES, E. W. HEY, M.D., M.S. Lond., F.R.C.S. Eng., External Examiner in Surgery of the London University.

JEWELL, W. H., M.D., B.S. Lond., D.P.H. Cantab., Surgeon for Ear, Nose, and Throat to the Royal Hospital, Richmond.

KHAN, M. M., M.D., B.S. Lond., D.P.H. Oxon., Director of the Government Hospital for Diseases of the Skin and Venereal Diseases, Teheran, Persia.

LESCHER, G. F., M.C., M.B. Cantab., Assistant Physician at the Derbyshire Royal Infirmary.

O'CONNOR, M., M.B., B.Ch., B.A.O. Irel., School Medical Officer for Plymouth.

SLESINGER, E. G., M.S., F.R.C.S., Assistant Surgeon to Guy's Hospital.

Edward Hain Memorial Cottage Hospital, St. Ives, Cornwall: NICHOLLS, J. M., L.R.C.P. Lond., M.R.C.S., MATTHEW, F. C., M.D., M.Ch. Edin., F.R.C.S. Edin., BEST, P., L.R.C.P., M.R.C.S., L.S.A., RICE, J. D., M.B., B.Ch., B.A.O. R.U.I., SMYTH, W. A., L.R.C.P. & S., L.M. Edin., Medical Officers; CRAZE, W. C. T., L.D.S. Glasg., Honorary Dental Surgeon.

Certifying Surgeons under the Factory and Workshop Acts: MACKAY, G. R. E. G., M.B., M.Ch. Edin. (Currie); FALKNER, H. G., M.R.C.P., L.R.C.S. Irel. (Lynton); NYHAN, C., L.R.C.P. & S. Edin., L.R.F.P.S. Glasg. (Clonakilty).

Vacancies.

For further information refer to the advertisement columns.

All Saints' Hospital (for Genito-Urinary Diseases), 49-57, Vauxhall Bridge-road, Victoria, S.W.—H.S. £100.

Ashton-under-Lyne District Infirmary.—Two Asst. H.S.'s. £200.

Barnsley, Beckett Hospital.—Jun. H.S. £200.

Barrow-in-Furness, North Lonsdale Hospital.—Second Res. H.S. £225.

Belfast Mater Infirmorum Hospital.—Hon. P.

Bethnal Green Infirmary.—Asst. Med. Supt. £400.

Birkenhead Borough Hospital.—Sen. and Jun. H.S.'s. £200 and £170.

Birmingham City Fever Hospital Service.—Asst. M.O. £350.

Birmingham City Hospital, Little Bromwich.—Med. Supt. £700.

Birmingham, Erdington Infirmary, House, and Children's Homes.—Female Second Asst. M.O. £275.

Birmingham General Hospital.—H.S. £125. H.P. and Cas. H.S. £100 each. Also Res. Surg. O. £180.

Birmingham, West Heath Sanatorium.—Med. Supt. £500.

Birmingham, Yardley-road Sanatorium and Anti-tuberculosis Centre.—Second and Third Asst. Res. M.O.'s. £450 and £400.

Bradford Children's Hospital.—H.S. £180.

Bridgend, Glamorgan County Asylum.—Jun. Asst. M.O. £350.

Burnley County Borough.—Asst. M.O. £550.

Burton-on-Trent County Borough.—Asst. M.O. £500.

Cairo, Egyptian Government, Ministry of Education.—Professor of Pathology. L.E. 1200-1400.

Derby, Derbyshire Royal Infirmary.—Oph. H.S. £200.

Dorset County Council.—Asst. County M.O. £500.

Evelina Hospital for Children, Southwark, S.E.—H.S. £160.

Glasgow, Bellahouston Hospital.—Res. M.O. £250.

Glossop Dale Rural District Council.—Joint M.O.H. £600.

Gloucestershire Royal Infirmary and Eye Institution.—H.P. £175.

Great Yarmouth County Borough.—Asst. M.O.H. £500.

Hereford County and City Mental Hospital.—Second Asst. M.O. £350.

Hospital for Diseases of the Skin, 71, Blackfriars-road, S.E.—Clin. Asst.

Hospital for Sick Children, Great Ormond-street, London, W.C.—Surg. Registrar. £200.

Hounslow, Heston and Isleworth Urban District Council.—Asst. M.O.H. and Asst. Sch. M.O. £500.

Huddersfield Royal Infirmary.—Asst. H.S. £150.

Hull City Education Committee.—Asst. Sch. M.O. £500.

Hull Royal Infirmary.—Senr. H.S. £200. Also Cas. H.S. £150.

Inverness District Asylum.—Jun. Asst. M.O. £250.

Ipswich.—Asst. County M.O.H. £500.

Ipswich, East Suffolk County Education Committee.—Dent. S. £450.

Leeds General Infirmary.—Two H.P.'s

Leeds Public Dispensary.—Res. M.O. £200.

Leeds University.—Demonstrator in Exp. Phys. £250.

Lewisham Hospital.—Second Asst. M.O. £300.

Lincoln, Lindsey County Council.—Female Asst. M.O. £550.

Liverpool, West Derby Union, Mill-road Infirmary.—Asst. Res. M.O. £363.

London Hospital, Whitechapel, E.—Surgical Registrar. £365. Also Medical Registrar. £365. Also Hon. Dent. S.

London Lock Hospital, Dean-street, Oxford-street, W., and 283, Harrow-road, Paddington, W.—Pathologist. £500.

London Temperance Hospital, Hampstead-road, N.W.—Cas. O. £120.

Loughborough and District General Hospital and Dispensary.—Res. H.S. £200.

Macclesfield, Cheshire County Asylum, Parkside.—Asst. M.O. £350.

Macclesfield General Infirmary.—Res. H.S. £200.

Maidstone, Kent County Ophthalmic Hospital.—H.S. £250.

Manchester, Ancoats Hospital.—H.S. £100. Also Res. S.O. £200.

Manchester County Asylum, Prestwich.—Asst. M.O. £450.

Manor House Hospital, North End-road, Hampstead, N.W.—H.S. and Asst. Anæsth. £150.

Metropolitan Asylums Board, Infectious Hospitals Service.—Junr. Asst. M.O.'s. £515 6s.
Middlesbrough, North Ormesby Hospital.—Asst. H.S. £175.
Middlesbrough, North Riding Infirmary.—H.S. £200.
Newcastle-upon-Tyne, City Hospital for Infectious Diseases.—Res. Med Asst. £350.
Newcastle-upon-Tyne, Royal Victoria Infirmary.—Res. M.O. £350.
Newport, Mon., Royal Gwent Hospital.—Fourth Res. M.O. £180.
North Riding of Yorkshire County Council, Education Committee.—Asst. Sch. M.O. £500.
Norwich, Norfolk and Norwich Hospital.—Cas. O. £200.
Nottingham Education Committee.—Sch. Dent. £500.
Nottingham General Hospital.—Cas. H.S. £150.
Nottingham, Notts County Council.—Female Asst. Child Welfare M.O. and Asst. Sch. M.O. £500.
Oldham Royal Infirmary.—Third H.S. £200.
Poplar Hospital for Accidents, Poplar, E.—Asst. Res. S. £120.
Queen Charlotte's Lying-in Hospital, Marylebone-road, N.W.—Asst. M.O. £60.
Queen Mary's Hospital for East End, Stratford, E.—H.P.
Reading, Royal Berks Hospital.—Sen. Res. M.O. £350.
Roll of Honour Hospital for Children, 688, Harrow-road, W.—Hon. Asst. P. and H.S. £40.
Royal Eye Hospital, St. George's Circus, S.E.—Sen. H.S. £100. Also Clin. Assts.
Salford Royal Hospital.—H.S. £150.
Sheffield Royal Infirmary.—Two H.S's, one Ear, Nose, and Throat H.S. £150.
Southend Victoria Hospital, Southend-on-Sea.—H.S. £200
South London Hospital for Women, South Side, Clapham Common, S.W.—Female H.P. £100.
Stamford, Rutland, and General Infirmary, Stamford.—H.S. £200.
Stoke-on-Trent, North Staffordshire Infirmary.—H.S. £200.
Straits Settlements and Federated Malay States.—Thirty-three M.O.'s. $440 per month.
Swansea General and Eye Hospital.—Jun. H.S. £200.
Trowbridge, Wilts County Council.—Third Sch. Dent. £400.
Wakefield, Clayton Hospital.—Sen. and Jun. Res. H.S. £250 and £200.
Wallasey, Victoria Central Hospital and Wallasey Dispensary.—H.S. £250.
Wells Asylum, Somerset.—Sen. Asst. M.O., £400.
West End Hospital for Nervous Diseases, 73, Welbeck-street, W.—Hon. Med. Registrar.
West London Hospital, Hammersmith, W.—Asst. Anæsth.
West Riding County Council.—Sch. Med. Inspec. £500.
Woolwich Tuberculosis Dispensary, Maxey-road, Plumstead, S.E.—Asst. Tubere. O. £500.
Worcester County and City Mental Hospital, Powick.—Deputy Supt. £450. Also Jun. Asst. M.O. £300.

THE Chief Inspector of Factories, Home Office, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshops Acts at Hebden Bridge, Liskeard, Markfield, Singleton, Stonehaven, Stornoway, and at Wolverhampton.

The Home Secretary gives notice of a vacancy for a Second Medical Referee under the Workmen's Compensation Act, 1906, for the Marylebone and West London (Brompton) County Courts. Applications should reach the Private Secretary, Home Office, not later than May 5th, 1920.

Births, Marriages, and Deaths.

BIRTHS.

ADAMS.—On April 6th, at a Nursing Home in Chiswick, the wife of Dr. J. Wroth Adams, of a son.

METHVEN.—On April 8th, at King's-avenue, Clapham Park, S.W., the wife of J. C. W. Methven, M.R.C.S., L.R.C.P., of a son.

TERRY.—On April 1st, at Barton-street, Gloucester, the wife of H. Cairns Terry, M.B., of a son.

WARNER.—On April 1st, at Rydal, Woodford Green, Essex, the wife of Dr. H. P. Warner, of a son.

WATERS.—On April 8th, at Cranmore, Lymington, the wife of Dr. J. P. F. Waters, Maudsley Neurological Hospital, London, of a son.

MARRIAGES.

ATTLEE—MACONOCHIE.—At St. Paul's Church, York Place, Edinburgh, on Thursday, April 8th, by the Very Rev. the Dean of Edinburgh, Wilfrid Attlee, M.D., of Eton, youngest son of the late John Attlee, of Dorking, to Emily Bridget, younger daughter of C. C. Maconochie, K.C., C.B.E., of Avontoun, Linlithgow.

LETHEM—LAWRENCE.—On April 3rd, at the Parish Church, Adlington, Lancashire, William Ashley Lethem, M.C., M.B., D.P.H., to Barbara, youngest daughter of the late James Lawrence, J.P., and Mrs. Lawrence, of Kilhey Court, Worthington, Wigan.

VOSPER—RUDKIN.—On April 7th, at St. John's Church, Wembley, Middlesex, Cecil Vosper, M.R.C.S., L.R.C.P., to Catherine Alwine, younger daughter of Frank Rudkin, of Sudbury, Harrow.

DEATHS.

BIGG.—At Chagford, Devon, on March 29th, Edward Bigg, M.A., B.C. Cantab., and M.R.C.S., L.R.C.P., aged 45.

CHALMERS—On April 5th, at Calcutta, Albert John Chalmers, M.D., F.R.C.S., Director of Wellcome Laboratories, Khartoum.

LAMBERT.—On March 31st, at Mentone, France, Thomas Wilson Lambert, M.D. Cantab. L.R.C.S., L.R.C.P., son of the late Joseph Lambert, Cottingham.

NASH—On April 8th, Walter Llewellyn Nash, M.R.C.S., F.S.A., aged 78 years.

TICHBORNE—On April 6th, at his residence, Madeley-road, Ealing, of pneumonia following influenza, John Tichborne, M.D. Dub., late S.M.O., Northern Nigeria, and late Captain, R.A.M.C.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

MEDICAL PROBLEMS OF LIFE ASSURANCE.[1]

BY T. D. LISTER, C.B.E., M.D. LOND.

THOSE of us who have duties in relation to accident and disease insurance have many questions other than medical questions to put to ourselves before we can give an opinion on any case before us. There are considerations of public health, of private character, of self-interest of classes and of individuals, that profoundly affect our decisions after we have had placed before us all the medical facts obtainable. Assurance problems demand of us that we shall never lose sight of the fact that the medical evidence is only one part of the whole evidence put before us. The medical part is certainly essential, but we have to form a judgment on the relative importance and inter-relation of the medical and the other facts.

Heredity alone opens up a number of problems that are by no means settled. We are far from differentiating between personal conditions that can be ignored if a person comes of long-lived stock and those which cannot be so ignored. We know very little about heredity, but we give impressions derived chiefly from our own experience. These are affected by our endeavours to hold the medical scales evenly in the assurance market between the buyer and the seller, the public and the office. This ignorance—I speak for myself—caused me once to try to conceive the assessment of a life as resembling an attempt to foretell the future course of a missile, of which we only observe the mass, direction, and speed for a short moment in its journey. This led me to the fanciful idea of vital-trajectories.

Vital-Trajectories.

An individual is conceived, and from that moment there is in existence a force, the resultant of a number of components, including the possible handicap of conceptional disease, that should convey the new body in a certain direction, to a certain distance. It will, bar accidents, "live," as we say, for a longer or shorter time. Accidents, including illnesses, may happen to stop its progress, either pre-natal or post-natal. In insurance we usually have to make a judgment long after birth, and after a brief examination, with insufficient data as to the past, and knowing nothing of the future, we presume to form an opinion as to a future history. Sometimes we can see the coming disaster, the crashing of the shell, more or less plainly; sometimes we have reason to fear its early occurrence from loss of momentum or what not; and often we see no reason why we should not advise a bet on its arriving at the limit of its range. This figure of speech could be pursued, through many variations, to enable us to use it to illustrate both seen and unseen obstacles in the way of the "life." It is the business of this society to endeavour to gather and diffuse knowledge of these obstacles to the smooth course of the body through life. We want to learn the effects produced by a clogging environment and habits, the damage done by passing through target-screens of acute disease occurring in its path, and the mode and date of the probable cessation of its flight. Some lives, as we all know, pass through attack after attack of acute disease, or accidents and operations, unimpeded, undamaged so far as we can see. Others have lost momentum permanently from slight affection before we see them. At the moment we can only endeavour, so far as heredity is concerned, to visualise the forces derived from the ancestry in a life before us, and the effect of the absence or the presence of hindrances to the full accomplishment of the span of life. To take tubercle, for example, a family history of recovered tubercle is sometimes as favourable a point in a proposer with a personal history of pleurisy with effusion, as the family history of deaths from tubercle is unfavourable.

With all the sources of error I have tried to suggest we have one great safeguard. That is, that in the head office at any rate, of an insurance company, we have to place lives in classes rather than to insure individuals. A fact to which I wish to call attention is that there are certain differences of practice among the offices. Perhaps, I should say, there are certain classes of risks which are more acceptable at some offices than at others, and some less. Most of us have heard, and perhaps said, "I don't like to insure such and such a malady."

Counsels of Perfection.

Here is a justification for the development of our work to endeavour to secure more uniformity of practice, but the

[1] Abridged from the presidential address to the Assurance Medical Society delivered on March 3rd, 1920.

very circumstances of life insurance preclude us from carrying out the counsels of perfection that have been urged upon us. Ophthalmoscopy, otological observations, radiograms, have been recommended as preliminaries to insurance. Our commercial friends will not accept them. A proposer requires a policy; the office wants to sell him a contract. The proposer must not be kept waiting; the office will not incur undue expense. A force is introduced in this way which tends to lack of discrimination between the good and bad risks and to the broadening, fair or unfair, of classes of particular risks.

What, for instance, is the actual experience of mortality of the "running ear"? Is it best to group such cases with an all-round addition, or should we insist upon the otologist's report on every case? Do we go far enough, on the other hand, in albuminuria? In 1910 Dr. Hector Mackenzie suggested that a good many really assurable lives were refused on account of albuminuria. I have, I confess, recommended many cases of albuminuria for acceptance, "with removable extras," after microscopical examination of the centrifugalised deposits. I have also rejected many. Delay seems to be less of an obstacle in these cases than it is in otorrhœa, or perhaps it is that the cost is less.

Prophylactic Vaccination.

Shall we, after the experience of the army, ask questions as to inoculation for diseases other than small-pox by what are called "vaccines" as a preliminary to acceptance? Should we be disposed to diminish the premium to the proposer who has been through the whole list of stock vaccines? It has been suggested recently that all the policy-holders of a company should be offered free inoculation against the threatened recrudescence of influenza and its complications. The office would pay, and was to make a large economy on the saving of claims thus produced. The distinguished bacteriologist who made this suggestion scarcely appreciated the difficulties in his way.

Infective disease, as all know, forms but a very small part of the total life-risk. I am anxious to see some day, when we get the decennial supplement to the Registrar-General's report covering 1918–19—which will not be for 10 years, probably—whether the influenza mortality, including, if you like, respiratory diseases, has made such a big increase as to support an argument for inoculation as a preliminary to acceptance at ordinary rates. I would like to see the mortality figures of the inoculated for comparison. Still more important would be an inquiry as to the general prognosis of infective diseases nowadays.

The Biological Evolution of Disease.

The biological evolution of disease, a matter of great interest for the insurance companies, has as yet, not received enough attention. The endocrine secretions have a close relation to this study. Our difficulties as insurance advisers may become complicated by inquiries as to the health of the functions of many glands that we at present ignore, and we may be asked to ascertain whether the proposer regularly consumes a ration of some particular gland. The insurance of cases of enlarged thyroid, whether attended with the symptoms of Graves's disease or not, is a matter which not infrequently comes before us. We do not know much about their mortality, but my experience is that the outlook is not very bad, and that the majority of such cases are acceptable. But I would like more information from those who have large experience of these cases over many years.

Further, I want to know more about low tension. I hinted in the discussion on Dr. Otto May's recent paper on tuberculosis that the sphygmomanometer was useful in certain classes predisposed to tuberculosis or suffering from latent tubercle. In some of these the only discoverable sign may be a low tension, and such cases with any family history of tubercle, I should regard with much suspicion. The question of blood pressure has, I consider, some relation to the study of the endocrine secretions.

The Effect of Alcohol on the Duration of Life.

Alcohol is by no means exhausted as a subject for consideration. We know that for certain select lives, with a very high standard of moral hazard in the risk, there is a low mortality among teetotallers; while Sir Dyce Duckworth in 1904 expressed an opinion in favour of the moderate use of alcohol both among the healthy and the sick. The experiments upon which the case for total abstinence rests are chiefly reaction and discrimination time experiments. They are, perhaps, conclusive as showing the temporary depression of nervous and psychic rapidity of action due to doses of alcohol. I submit that such evidence is no criterion as to the effect on life duration. It may not be a good thing to be always energetic. That a drug capable of producing depression of energy may produce annihilation of energy in larger doses is one thing, but there are also drugs capable of producing exaltation of energy which may produce exhaustion. All that I feel myself able to say is that excesses are bad in either direction. Certainly many abstainers are drug-takers, even if it only be their tea that they take. To ascribe all the good effects on mortality, among certain excellent groups of lives, entirely to their abstinence from alcohol is unscientific, but inasmuch as total abstinence connotes other qualities making for longevity, it is therefore to be favourably regarded in assessment. On post-war affections, such as soldier's heart, malaria, dysentery, wounds, amputations, the reasoned guidance of physicians and surgeons, not only of war experience, will be of the greatest help to us. Does rapid action of the heart over a prolonged period tend to cardiac or vascular degeneration earlier than if the heart pursues a placid course throughout? Are war-neurasthenia and shell-shock things which increase mortality now that we hope there is no chance of their recurrence? Should they be "rated up" when the signs have disappeared?

There is all the difference in the world between the clinical diagnosis and prognosis of the obviously ill, and the insurance diagnosis and prognosis of the apparently well.

Some Difficulties Considered.

One great blank in our work is the impossibility of finding out the after-history of our insured invalids. What especially we do not know is the after-history of declined lives. An organisation established by all the offices could do a great deal by asking for the return of the claim papers in all cases where the proposers were known to have been rejected or rated up at any time. The results of our guess-work could then be estimated by analysing such results.

A great difficulty is to avoid being guided chiefly by "impressions." Another is the shifting ground of advancing knowledge, for instance, the improving tropical risk. The resulting tendency is always to broaden our work in life assurance. The office can, and usually does, take care of itself. But we are not serving the office well if we reject lives which are assurable at a price. In certain families death tends to occur from asthma, bronchitis, pneumonia, phthisis, and so forth; in others from arterio-sclerosis, aneurysm, fatty heart, syncope. What is the relation of such conditions to infections, notably hereditary and acquired syphilis in the latter group, or to gout, or to excessively strenuous living? There are opportunities for a great extension in our work in investigation, perhaps with actuarial assistance, of all these problems.

ARSENIC IN SUGAR.

A SERIOUS question arises in regard to the transport of foodstuffs when it is disclosed that arsenical or other poisonous consignments are packed amongst them. There were several sufferers from arsenical poisoning at Haslemere this week owing to the leakage of a weed-killer tin, the fluid reaching a barrel of moist sugar. Some 60 persons were affected, but happily without fatal result, the circumstances being promptly investigated by the local medical officer, Dr. R. J. Hutchinson, conjointly with Dr. Spencer Low of the Ministry of Health. It seems to us that it is most desirable that poisonous commodities—and arsenical weed-killer is a very common one—should be consigned in hermetically sealed vessels, proof against the possibility of leakage. The occurrence at Haslemere might have been much more serious than it was, and it is questionable whether those in charge of local transport should be allowed to convey goods with foods and powerful poisons together in close proximity.

THE MEASUREMENT OF CARDIO-VASCULAR DEPRESSION.

AN interesting method of standardising the response of a patient to the joint influence of anæsthesia and surgical shock has been elaborated by Dr. Charles W. Moots and Dr. E. I. McKesson.[1] In order that an accurate observation may be kept on the pressure changes the cuff of a sphygmomanometer is kept in position during the operation and a stethoscope bound below it with elastic webbing. Records are made from time to time and entered upon a graph. The following table is laid down by the authors as a standard for classification:—

Safe.—10 to 15 per cent. increase on pulse-rate without change in pressure. 10 to 15 per cent. decrease in blood pressure without change in pulse-rate.

Dangerous.—15 to 25 per cent. increase in pulse-rate with 15 to 25 per cent. decrease in blood pressure.

Fatal.—Progressively increasing pulse-rate above 100 with progressively falling blood pressure of 80 or less systolic and 20 or less pulse pressure, for more than 20 minutes.

Their clinical work has convinced them that the final factor in shock is muscular exhaustion. When a patient is heavily anæsthetised in order to obtain extreme relaxation, he is "half-shocked," and often a very little trauma will be sufficient to produce fatal depression. The value of anæsthetics in reducing surgical shock has long been realised. The possibility of their becoming adjuvant to shock at a later stage raises important considerations, and the whole subject is well worthy of research.

[1] Guy's Hospital Gazette, March 6th, 1920.

THEATRE CHILDREN.

THE rules, dated Jan. 12th, 1920, relating to children licensed to take part in entertainments under the Prevention of Cruelty to Children Act, and the report of the Committee (Cmd. 484) on which they are based show that about 33 children under 12 years of age are thus employed in London, a number increased to 95 during the pantomime season. The rules lay down definite standards for the health and education of these children and the committee found them considerably superior in culture and intelligence to the average child educated in the public elementary school. The licensing depends in practice on the school medical officer, who has to file a certificate of fitness every three months, although, strangely enough, the committee had no medical representative nor was any medical evidence laid before it. According to the wording of the rules, any school medical officer in any area may be asked to certify. While in general the report and regulations are commendable, it is manifestly absurd to require on each certificate particulars of previous licences, lists of text-books to be used, certificates, photographs, reports of last head teacher on the child's educational attainments, and so forth. The thing would be funny if it did not entail so pathetic a waste of time.

THE PEOPLE'S REFRESHMENT HOUSE ASSOCIATION.

THE twenty-third annual report of this association shows a condition of steady progress. At the end of 1919 there were 150 licensed inns held by the association, and during the present year seven will be taken over, while negotiations are proceeding with the Cambridgeshire, Huntingdonshire, and Isle of Ely Public House Trust Association for taking over seven other houses all within easy distance of Cambridge. Ten houses at present held by the Derbyshire Public House Trust will also be taken over at an early date. Since January, 1916, the P.R.H.A. has assisted the Central Control Board (Liquor Traffic) in the management of seven important houses in a directly controlled industrial area. The financial statement shows that after writing off proportion of repairs to date, placing £4069 to depreciation reserve, and paying £1582 interest on loan stock, &c., the amount available for disposal is £13,217 18*s*. 11*d*. To encourage food production the potato clubs started in 1918 were continued in 1919, and prizes to the amount of £258 were awarded, while £494 were given to hospitals, village nursing institutions, and similar charities.

THE MEDICAL NEEDS OF TRINIDAD AND TOBAGO.

INSTRUCTION is to be drawn from the difficulties which arose in the medical administration of Trinidad during the year 1918.

In the first place, there was a good deal of sickness among the members of the medical staff, necessitating frequent changes and causing dislocation of the work. At the Port of Spain Colonial Hospital a nurses' home is an urgent necessity. The hospital accommodation was strained throughout the year, the average number of occupied beds being 345, while the authorised number is 340; at one time as many as 399 patients were accommodated in the wards. An out-patient department is badly needed, and an enlargement of the House of Refuge for aged and incurable poor patients who at present have to be treated at the Colonial Hospital. The principal causes of admission were enteric fever (445 cases and 83 deaths), malaria (331 cases and 22 deaths), pulmonary tuberculosis (235 cases and 118 deaths), and venereal disease (489 cases and 22 deaths).

Similar conditions of overcrowding existed at San Fernando, the next largest town after the capital. The hospital accommodation is for 123, but as many as 160 patients were sometimes under treatment in the wards. Here ankylostomiasis (477 cases) and venereal affections (301) were the chief diseases under treatment; the former disease (of which 29 cases were fatal) showed a large increase (154) over the admissions in 1917. A good water-supply and an efficient type of latrine, the use of which should be compulsory, are urgent necessities in the villages. Dr. E. A. Turpin, who reports on this hospital, considers that a mild anthelmintic dose (chenopodium oil or thymol) is far more reliable for diagnosing the condition than examination of the fæces for ova, the latter often giving negative results, though the patient is heavily infected. There were 123 admissions for pneumonia, of whom 50 died, 25 of these deaths occurring in October, when the disease was "epidemic in character and of a very virulent type"—in fact, influenza. In regard to the treatment of chronic amœbic dysentery and the best means of preventing its recurrence, as emetine given hypodermically does not get rid of the cysts, Dr. Turpin advises a combination of emetine-bismuth-iodide by the mouth, with emetine hypodermically and in large enemata, ol. chenopodium being also administered to expel the cysts; this combination has given good results.

At the Leper Asylum there were 502 inmates at the beginning of the year and 550 at the end, the daily average under care being 534. Of the 203 admissions during the year, 85 were inhabitants of Trinidad or Tobago, while 95 were immigrants from India. The admissions to the St. Augustine Hospital for yaws numbered 1299, more than in any year since the institution was opened, which has caused considerable inconvenience. Since the adoption of salvarsan treatment the number of admissions has been practically doubled (974 compared with 473, annual average). The average duration of stay in hospital, which was formerly 166 days, is now, with the use of salvarsan, only 51 days. The percentage of recurrent cases, which was formerly 12, has now been reduced to 5·4.

In his introductory observations Dr. F. A. de Verteuil, the acting Surgeon-General of Trinidad, draws attention to the numerous resignations which have taken place during recent years among the junior medical officers of the staff, which he considers due to the very meagre salary (£250 per annum) that is offered. As to this there can be no difference of opinion. It would be well for the colonial administrative authorities to give their immediate attention to this matter, as well as to the unsuitability of the quarters for medical officers and nurses that are at present provided.

A SECRET REMEDY BEFORE AN AUSTRIAN COURT.

Dr. Ottmar Reiner, a surgeon in Gracz (Styria), sued Kinsky Renard Maria, the world-famed opera-singer, for a fee of 50,000 crowns, the actress being willing to pay only 10,000 crowns, although, as Dr. Reiner alleged, he saved her life. The patient suffered from X ray burns, which defied every known treatment, and in consequence of the pain of which she became a morphinist. She then consulted Dr. Reiner, who succeeded in curing her entirely in eight weeks with the aid of an ointment, the secret of which he did not divulge. The actress's lawyer argued that the ointment was not the invention of Dr. Reiner, but that he inherited its secret from his grandfather. He reserved an exceedingly profitable secret monopoly for himself, which was contrary to the ethical duties of a doctor. The court accepted this argument, and decided to summon the ethical board of the Medical Society as to the justification of this exorbitant fee from a medico-ethical point of view. The board declared that to keep the composition of an ointment secret for the sake of material gain was contrary to medical ethics, and that Dr. Reiner had already been abundantly paid by the offered 10,000 crowns (£4000). Whereupon the court refused Dr. Reiner's appeal.

A POSTHUMOUS REQUEST.

Mrs. F. H. Seddon, of Clifton Down, Bristol, who died recently, left the following instructions: "That before my body be placed in the coffin the spine and spinal marrow of the neck shall be completely severed by a competent surgeon, to whom a fee of £25 is to be paid."

SCHOOL MEDICAL INSPECTION IN NATAL.

IN the report on School Medical Inspection in Natal during 1918, by Dr. A. B. M. Thomson, it is stated that, of the 1719 routine children examined as many as 646 required treatment—that is, 37·58 per cent. There was a general tendency to overclothe the children in some of the better schools; but allusion is made to the "prevailing fashion among the younger school girls. The object seems to be to show as much of the bare leg as possible, and this is accomplished by wearing very short skirts and still shorter socks. The result is grotesque, and in some cases immodest. Undoubtedly in every instance it is unhealthy, because it exposes a large surface of the body to extremes of temperature, and leads to chills and rheumatism. Why such an outrageous dress should be inflicted on children is more than mere man can understand." This very sensible observation might be made with regard to the dress of similar children in many London schools at the present day. It is said that "the amount of malnutrition has increased" in 1918; but only one child is recorded as being badly nourished, a girl 7 years of age; while 21 per cent. of the boys and 14·5 per cent. of the girls are returned as "medium," and all the remainder as "good." Food prices had risen, and wages had not increased in proportion. Free meals for necessitous children are provided by the Provincial Council. Dr. Thomson recommends the provision of a midday meal, which could be done for 4*d*. a day by the education authority, a much more nutritious dinner being afforded by centralised cooking than could be given by individual parents; he considers that "a universal midday meal at school would materially lessen backwardness among school children, and it would also improve their health and increase their happiness. In other words, it would pay." It is stated that "there were 14 cases of eczema, all of them being 'sores' (impetigo)." Some good recommendations are made as to diet; 37 per cent. of the boys and 30·2 per cent. of the girls had four or more decayed teeth, which, however, is an improvement on the previous year, when the percentages of dental defect were 43 and 39 respectively. Adenoids are met with, but much improvement has taken place, and parents are generally anxious to have them attended to. In 8·2 per cent. of the boys and 6·4 per cent. of the girls adenoids were found, compared with 13·7 and 10·4 per cent. in the previous year. During the year 222 students at native training colleges were examined as to physical fitness; 14·8 per cent. suffered from malnutrition, and in 17·5 per cent. the vision was defective; there were many cases of eyestrain, and the lighting in some of the classrooms was not satisfactory. Some students also seemed to be suffering from over-pressure.

RESCISSION OF RATS ORDERS: A CORRECTION.

THE last sentence in a note on this subject which appeared in THE LANCET of April 3rd (p. 794) should have read: The Rats and Mice (Destruction) Act, 1919, has rendered this memorandum obsolete, and it is now formally withdrawn.